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ABSTRACT

Institutional research that focuses on professional development is addressed in 35 papers from the 1982 meeting of the North East Association for Institutional Research. Titles and authors include the following: "Modeling College Student Adjustment and Retention for the Individual Institution" (Norman D. Aitken); "The Development Saga of an Institutional Research Database at a State College" (Edward L. Delaney); "Projecting Enrollments at Small Colleges (The Role of the Institutional Researcher)" (Randall Draper); "A Model of University Tenure Decision-Making: Some Additional Results" (Winship C. Fuller, Susan A. Goodwin); "Microcomputers in Institutional Research" (Leah R. Hutten); "Strategic Planning: Working with Department Chairs" (Antoinette Iadarola); "The Design and Implementation of an Evening Student Survey: Methodological Issues and Practical Considerations" (Linda Lyons); "Developing a Composite of Institutional Reputation and Assessing Its Impact upon Selected Student Behaviors" (John P. Mandryk); "Improving Faculty Use of Student Outcomes Information" (Sidney S. Micek); "Sexual Inequity in Career Choice: How Can Colleges Help?" (Jean V. Morlock); and "Comparative Fiscal Analysis in Higher Education" (David L. Rumpf). (SW)

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DOING INSTITUTIONAL RESEARCH:

A Focus on Professional Development

Papers from the Ninth Annual Meeting

of the

North East Association for Institutional Research

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New England Center

Durham, New Hampshire

October 17-19, 1982

HE 016 545

PREFACE

The Ninth Annual Conference of the North East Association for Institutional Research was held October 17-19, 1982, at the New England Center, Durham, New Hampshire. The conference theme, "Doing Institutional Research: A Focus on Professional Development" drew 167 participants.

The Call for Papers produced a large number of proposals, which made possible a wide variety of topics and presentation formats. The program consisted of one symposium, three professional development seminars, five panels, and 38 paper presentations. The three workshops were well attended and provided an opportunity for members to choose among attractive alternatives. The Conference Evaluation indicated an increase in the "pertinence of paper presentations," a tribute to those who have contributed their work for others to share.

John McCredie presented a relevant keynote address on Sunday evening. Mr. McCredie is President of EDUCOM and an active institutional researcher. He described various strategies for campus computing, drawing on recent comprehensive studies at a number of different institutions.

We hope that you will find the material in the Ninth Proceedings to be stimulating and informative. In reading the reports you may see some references to appended materials that are not included. The need to keep the papers within certain page limitations precludes the inclusion of excessive tables, copies of questionnaires, etc. Please feel free to contact the individuals who submitted the papers for this additional information.

The Association is grateful to Bob Lay (Boston College) for his excellent job as Chair of the Conference Program Committee. John Kraus, Local Arrangements Chair (University of New Hampshire) and his able staff were responsible for a particularly well run conference.

The papers included in the Proceedings are those submitted for publication and do not cover all the presentations made at the conference. Appreciation is due all who contributed their time as moderators, presenters, and panelists.

The final form of the Proceedings is thanks to the efforts of Peter Farago, Dave Bradley, Wendall Lorang, Bob Lay, and Ed Delaney, who helped review papers for inclusion. Special commendation goes to Helen Rock, State University of New York at Plattsburgh, who provided editorial assistance for the third year in a row.

Diana M. Green, NEAIR Publications Chair

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MODELING COLLEGE STUDENT ADJUSTMENT AND RETENTION FOR THE INDIVIDUAL INSTITUTION

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Individual institutions of higher learning have become increasingly interested in systematically examining the determinants of student adjustment and retention on their own campuses. This paper addresses some of the issues an institutional researcher is likely to face in attempting to construct both a methodologically sound model of retention and yet one which is of practical value to the institution itself. In other words, the paper will examine both the science and art of model building as it pertains to institutionally based studies of college student retention.

STRUCTURAL MODEL

We begin by defining a college student retention model as a logical representation of the existing theory of student adjustment and reaction to the college experience as it affects the ultimate outcome of whether or not the student continues (or completes) her/his education at a particular institution. The model will normally consist of a series of structural equations, which are defined as equations which specify the detailed behavioral relationships hypothesized by the theory without exploiting possibilities of algebraic simplification. Each equation in the structural model, therefore, will normally hypothesize a direct causal relationship. This in turn means that the model will provide a framework through which one can explicitly trace the effects of a change in any variable or parameter through the theory's behavioral relationships. A structural model,

therefore, stands in sharp contrast to a single predictive equation, where retention is made to depend upon a series of explanatory variables which are justified at most on an ad hoc basis. Not only is the latter type of equation likely to produce unreliable results, but it is almost impossible to use for policy evaluation since there is no behavioral structure within which to observe the effect of a policy change.

Obstacles to Model Estimation

Despite the desirability of structural models, the following obstacles need to be overcome by the institutional researcher who would like to estimate such a model for his or her institution:

(1) Absence of a well-defined and generally accepted theory of student adjustment and retention.

(2) The need to modify any general theory of retention to fit the unique characteristics and specific needs of the individual institution.

(3) The need to find operational measures of theoretical variables.

(4) Identification of the most effective statistical techniques for estimating the models parameters.

The objective of this paper is to discuss methods by which the above obstacles can be overcome.

General Theory of Student Retention

While there may be no well-defined general theory of student retention, there is sufficient agreement in the literature about the basic determinants of retention to allow the construction of at least a simple structural model. For example, the major writers on the subject tend to agree that retention is largely determined by the successful integration of the student into the intellectual and social systems of the institution. (Spady, 1970; Tinto, 1975). Each of these major summation aspects of a student's

experience is, in turn, determined by a combination of factors, including individual attributes, family background of the student and student interaction with both peers and faculty.

Based on a revised and somewhat condensed version of Tinto's theory of retention, we have specified the following model. It is presented by way of illustration only and is not intended as a comprehensive model of retention.

$$\text{Retention (R)} = a_o + a_1AI + a_2SI + u_a \quad (1)$$

$$\text{Academic Integration (AI)} = b_o + b_1GP + b_2ID + u_b \quad (2)$$

$$\text{Social Integration (SI)} = c_o + c_1PGI + c_2FI + c_3P + u_c \quad (3)$$

$$\text{Grade Performance (GP)} = d_o + d_1IA + d_2FS + d_3PGS + d_4FC + u_d \quad (4)$$

The variables on the left-hand side of the equal signs are endogenous (i.e., determined within the model) while all other variables in the equations are exogenous (determined outside the model). The lower case letters ($a_o \ldots a_5$; $b_o \ldots b_6$, etc.) are parameters (to be estimated empirically) while the u's are random error terms.

For equation (1), student retention by a specific institution (R) is assumed to be a function of the degree to which the student is integrated into the academic (AI) and social (SI) systems of the institution. Equation (2) specifies that academic integration is determined by grade performance (GP) and intellectual development (ID) which is defined as the student's "evaluation of the academic system" (Tinto, 1975, p. 104). For equation (3) social integration (SI) is a function of the extent of peer interaction (PGI), the extent of interaction with faculty (FI) and the student's personality (P). Finally, for equation (4), grade performance (GP) is assumed to be determined by the intellectual ability of the

student (IA), the degree of family support for the student completing a college education (FS), the degree of peer group support for intellectual and academic activities (PGS), and the degree of close personal contact with faculty around intellectual or academic issues (FC).

APPLIED MODEL

Which Type of Retention?

Having specified a general theoretical model of retention, the next step in the process is to convert the general model into an applied model which fits the unique characteristics and specific needs of the individual institution. In order to achieve this objective, we shall have to simultaneously overcome obstacles two and three listed above. One of the first decisions an institution will have to make is whether it wants to focus on voluntary dropouts or whether its retention equation is to account for both voluntary withdrawal and academic dismissals. If the voluntary withdrawal model is chosen, then the study sample to be used to estimate the model's statistical parameters would exclude all students dismissed from the institution for academic reasons. If the model is to explain the total loss of students, including academic dismissals, then not only would the study sample include all types of student withdrawals, but it will also require the introduction of a new independent variable in equation (1). Since students could be forced to leave the college or university solely because they did not meet a certain grade requirement, a dummy variable reflecting the grade requirement should be introduced as an independent variable.

The advantage of the latter approach is that the relative size of the "Meet GPA Requirement" coefficient would indicate the relative importance

of academic dismissal in explaining the overall loss of students, while at the same time standardizing for the effects of academic dismissal in testing for the significance of the other variables that explain voluntary withdrawal. The equation, therefore, provides a compact summary of the institution's overall retention situation, and if it were to be estimated for a series of years, changes in the relative importance of causes would be revealed by corresponding changes in coefficients.

Retention Equation

Once the type of model is decided upon, the researcher must then examine the other independent variables in equation (1) and see how they might best be measured. Because academic integration and social integration are abstract theoretical variables, the researcher may decide to settle for redefined proxy variables which are easier to measure, such as academic satisfaction and social satisfaction. Assuming the given institution adopts the more comprehensive retention model and makes the specified changes, the applied version of equation (1) would then appear as follows:

$$\text{Retention (R)} = a_o + a_1 AS + a_2 SS + a_3 MGPA + u_a$$

Where the dependent variable, retention (R), is a dummy variable which takes the value one if the student is retained by the institution and a value of zero if the student withdraws or is dismissed from the institution. AS and the SS are survey response measures for each individual student in the study, which measure satisfaction with their academic and social experience. Finally, MGPA, another dummy variable, takes the value of one if the student has met the institution's minimum grade point average and the value of zero if the student has not achieved the required minimum.

Academic Satisfaction

In constructing the applied version of equation (2), academic integration will obviously need to be replaced by academic satisfaction. In terms of the independent variables, GP is easily measured by student grade point average, but intellectual development may prove impossible to measure. Since intellectual development is supposed to measure a student's overall evaluation of the academic system, it may be possible to substitute a series of variables for ID, each of which measures the student's evaluation of a specific part or component of the academic environment. In addition, the researcher may want to add additional variables to account for special programs which might have a favorable impact on a student's satisfaction with his or her academic experience, such as an honors program, academic dormitory, or various types of academically based extracurricular activities (e.g. language club or debate team). In the latter case, the equation serves as a test of the effectiveness of various types of programs which constitute the policy of the institution. The following equation is representative of the type of equation which might be specified.

$$\text{Academic Satisfaction (AS)} = b_o + b_1GPA + b_2CR + b_3AAR + b_4LR + b_5HP + b_6AD + b_7AEA + u_b$$

Where AS represents overall student satisfaction with the academic program and is measured as a survey response item and GPA is measured by the student's grade point average. CR, AAR, and LR represent student ratings of the curriculum, academic advising, and library facilities and they presumably would also be measured via a survey. HP, AD, and AEA are dummy variables which measure whether or not the student is participating in the honors program, living in an academic dormitory, and participating in an academic extracurricular activity, respectively.

Social Satisfaction

While student satisfaction with their social experience may be largely determined by the extent of positive interaction with peers, the interaction itself can take place in several different types of environments which the researcher may wish to identify in the model. Specifically, the interaction can take place (1) through academic or classroom related activity (e.g. study groups), (2) through participation in extracurricular activities, or (3) within the residence hall system. Since each type of interaction may have a different type or degree of effect on student reaction to both their social and academic experience, it is not entirely clear how student social experiences can be most effectively modeled.

It may depend primarily on the way students conceptually aggregate the various types of social experiences into a meaningful whole when they consciously evaluate the institution. Do students tend to sum up the various types of social experience into one overall reaction or evaluation of their social experience, per se, or do they incorporate the relevant social experience into their evaluation of the academic, residential living, and extracurricular experience? The second hypothesis implies a very different type of model than the first and the choice between the two alternatives will need to be decided by additional empirical work. Because the first hypothesis is consistent with Tinto's theory, it has been used as the basis for formulating the following equation. The alternative approach, however, has also been used elsewhere. (Aitken, 1982)

$$\text{Social Satisfaction (SS)} = c_0 + c_1\text{RHSR} + c_2\text{ASR} + c_3\text{ESR} + c_4\text{FSR} + c_5\text{SO} + u_c$$

Where student satisfaction with their total social experience (SS) is determined by satisfaction with residence hall social relations (RHSR),

academic social relations (ASR), extracurricular social relations (ESR), social relations with faculty (FSR), and some measure of the students degree of optimism (SO) in lieu of a more comprehensive measure of student personality. All specified variables should be measured as survey responses. The researcher may also wish to include additional variables to measure the impact of counseling services or orientation programs offered by the institution for the purpose of improving student social relations.

Grade Performance

Grade performance is perhaps the easiest equation to convert to the applied form:

$$GPA = d_o + d_1SATV + d_2SATM + d_3HSR + d_4PE + d_5PGS + d_6FC + d_7HP + d_8AD + d_9AEA + u_d$$

Where student grade point average (GPA) is a function of SAT verbal and math scores and high school rank (HSR) as measures of intellectual ability, educational level of parents (PE) as a proxy variable for parental support of students' academic goals, peer group support for academic activity (PGS) and degree of contact with faculty around academic issues (FC); with the last two variables being measured by survey responses. Finally, additional variables may be added to account for student participation in various programs which may improve academic performance. The variables previously included in the academic satisfaction equation have been included here as well (i.e. participation in the honors program (HP), academic dormitory (AD), and academic extracurricular activities (AEA).

Additional Equations

The model need not be limited to the four basic equations derived from the theoretical model, but could be expanded by choosing one or more

independent variables for use as a dependent variable in a new equation. (e.g. the effect of type of residence hall on residence hall social relations might be explored by specifying an additional equation with RHSR as the dependent variable.) Consequently, the institutional researcher has the option of expanding the model to cover areas or issues of primary concern to the institution.

Statistical Estimation

The parameters of the model (e.g. the lower case letters listed in the above equations) can be estimated through the use of multiple regression analysis which is both described in a number of standard statistical works (e.g. Kane, 1968) and is included as a program in the Statistical Package for the Social Science (1975).

In the event that the specified model contains one or more sets of simultaneous equations, special types of regression analysis may be required. (Anderson and Evans, 1974) Where the model is characterized by a one way flow of causal influence among the dependent variables, like the models specified above, estimates of the models' parameters can be obtained by the use of ordinary least squares regression.

CONCLUSION

Despite the lack of a comprehensive general theory of college student retention, it should be possible for the institutional researcher to develop and empirically estimate a model of college student retention which is not only methodologically sound but also capable of capturing the unique features of the specific institution. The latter feature, in turn, means that the model may eventually be used for policy evaluation and simulation.

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A Comparison of Minority and Nonminority Faculty Perceptions of Career Opportunities at Penn State

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INTRODUCTION

Faculty hiring and promotion practices have undergone substantial changes over the last 25 years. These changes have resulted in part from the passage of over 45 pieces of legislation designed to ensure equal opportunity for minorities and women. Most of these laws, and several executive orders, have been extended to include institutions of higher education. Given these mandates, many colleges and universities have sought to strengthen affirmative action programs to improve recruitment, hiring, and professional advancement opportunities for women and minority faculty members.

The process of change takes time. According to Braithwaite and Beatty (1981), in 1978, all minority groups combined comprised 16.1 percent of the total U. S. population. Yet, they constituted only 1 percent of all recipients of J.D., M.D., and Ph.D. degrees and 3 percent of the recipients of the master's degrees. This small group was responsible for approximately 7 percent of the research knowledge, production and utilization effort--primarily concentrated in education and social science fields. Estimates for 1976 revealed that blacks represented about 4.4 percent of the total higher education faculty and that black males held 1.7 percent of full professorships. Despite all the legislation, the achievement of equal employment opportunity in higher education has been slow.

Current pressures on institutions stemming from the projected decline in enrollments and the realities of financial stringency are resulting in fewer new faculty positions. In addition to these pressures, a recent article in The Chronicle of Higher Education (1981) implies that the Reagan Administration is altering the federal government's approach to affirmative action by adopting "voluntary compliance" as a means of achieving affirmative action goals. This change in direction, it is feared, may retard the progress that affirmative action programs have produced.

Steps have been taken by some institutions to assess their effectiveness in creating an environment conducive to equitable access and advancement of faculty and professional staff. For example, after identifying a disproportionate rate of attrition for female faculty members as compared to men, Dartmouth College initiated a survey of junior faculty to determine the factors contributing to this occurrence (1978). In another project, the American Institute for Research, funded by a grant from the Carnegie Corporation of New York, developed an Institutional Self-Study Guide on Sex Equity to "evaluate the extent and effects of inequitable treatment by sex and race" (n.d.).

Penn State, like other institutions, is concerned with encouraging access to its academic ranks by minorities and women. In accordance with Executive Order 11246, the University established an Affirmative Action Office reporting to the University Provost in 1972. Over the next few years, several studies were conducted to explore reasons why minorities, blacks in particular, left the University.

In November 1981, the Forum on Black Affairs at The Pennsylvania State University submitted a report to the University President entitled "Bucking the Trend--Toward the Development of a Program to Stabilize and Expand the Number of Black Faculty, Staff and Graduate Students at The Pennsylvania State University" (1981). The report showed that from 1975 to 1980 the

number of full-time faculty declined by 5.9 percent while the number of black faculty declined by 11.9 percent. One outcome of the Forum's report was a decision to conduct a faculty survey to assess factors militating against more successful hiring and retention of minority faculty.

METHODOLOGY

The basic problem which the survey was designed to address was the identification of circumstances which restrict black and other minority faculty accesss to and professional advancement within Penn State. During initial survey development efforts, a number of questions surfaced regarding general career development: How do faculty hear about a position at Penn State? Why do they come to Penn State? What were their expectations? How are they treated professionally and personally by members of their departments? Is a mentoring relationship important? From these general questions eight survey areas were identified: recruitment; promotion and tenure; mentoring; inclusion, acceptance and recognition; feedback and evaluation; role in university service; professional opportunities; and affirmative action. Between five and 15 descriptive statements were prepared for each area. For each statement, respondents had the choice of selecting one of six possible responses, from 1--strongly disagree to 6--strongly agree. For explanatory purposes, a 3.65 average response (which falls in the 3.50 to 4.49 range) was interpreted as almost "moderately agree" (4.0), while a 4.25 response (in the same range) was referred to as more than "moderately agree." The general format of the "Bucking the Trend" survey was adopted from the Dartmouth College survey of junior faculty (1978). Prior to conducting the survey, an instrument pretest was conducted with a sample of 22 faculty members.

The faculty response groups selected for analysis were: Blacks, other minorities (Asian, Hispanics, American Indians and others) and a proportionately representative sample of nonminorities. The sample of nonminorities was selected to mirror proportionately the social and academic characteristics portrayed by the two minority populations compared to the total population of nonminority faculty. The survey was sent to all 179 minority faculty at Penn State and a representative nonminority sample of 323 faculty. Approximately 80 percent of all surveys were returned--139 minority faculty and 261 nonminority faculty surveys. The minority faculty response group distribution according to the survey's categories included: 67 percent (93) Asian, 19 percent (26) Black, 10 percent (14) Hispanic, 4 percent (5) minority faculty who did not specify one of the prescribed racial groups, and 1 percent (1) American Indian.

Two basic statistical procedures were used to analyze the survey data. The chi square procedure was used to identify differences when frequency distribution data were developed. In addition, analysis of variance (AOV) was used to measure differences in average responses. The .05 level of significance was used to determine whether or not the differences were significant. Where AOV procedures yielded significant differences, the post hoc Duncan test was applied to measure differences among the groups. The Duncan procedure requires equal sample sizes; however, a harmonic mean can be used for analytical purposes when cell sizes are unequal. The Statistical Analysis Systems (SAS) computer package was employed to perform these statistical analyses.

FINDINGS AND OVERVIEW OF FACULTY GROUP RESPONSES

Although the survey uncovered many differences in perceptions between black, other minority, and nonminority respondents, on nearly 60 percent of the survey items, the survey respondents were in relative agreement. Black faculty responses differed significantly from nonminority and other minority

faculty on approximately 40 percent and 30 percent, respectively, of the questionnaire items. However, the group of other minority faculty differed from nonminority faculty on only 15 percent of the questionnaire items. In a statistical sense, the group of other minority faculty resembled more closely the responses of nonminority faculty than black faculty. The major focus of the discussion is directed, therefore, on those items on which black faculty responses differed significantly from nonminority faculty, with additional consideration given to items on which both black and other minority faculty differed significantly from nonminority faculty.

There also seemed to be consistency throughout the survey on the various statements on which the individual groups agreed or disagreed. By looking at a group's responses across the several sections of the survey, noting particularly where one group differed from the others, it was possible to develop an overview for each group. All differences cited are statistically significant.

Nonminority Faculty

The nonminority group tended to agree more than minority faculty with items in the survey which state that a condition of equality exists regardless of race or sex. For example, the nonminority group generally believed that their departments are doing what they can to provide equal access and opportunity for all faculty. Where the nonminority faculty were less in agreement with a survey item, the focus was on departmental activity. For example, nonminority faculty perceived that department heads take an active role in recruiting minorities (4.2), but they recognized also that minority faculty are not always utilized to help find other minority faculty when new positions are open (3.42). The nonminority group only moderately agreed about the likelihood that a mentoring system would be useful in order to advance professionally (4.32) or that annual performance appraisals provide them with valuable and constructive information (3.57).

In terms of the professional environment, nonminority faculty agreed that their ideas are valued (4.54) and exchanged within the department. In addition, they perceived that colleagues consult with (4.85) and are consulted by (4.87) minorities in the department. Nonminority respondents spent less of their time than black respondents in university service. Nonminorities agreed that all members of their department are equally encouraged in their pursuits of promotion and tenure and have equal access to sabbaticals and other competitive university opportunities; they perceived that the department is actively ensuring that minorities receive equal salaries among colleagues of equal abilities.

In a capsule, the nonminority faculty sample consistently pointed out that their departments are trying to provide an equitable environment for professional access and advancement.

Other Minority Faculty

Other minority faculty (e.g., Asians and Hispanics) had significantly different responses from the nonminority sample on a few items which dealt with recruitment; inclusion, acceptance and recognition; professional opportunity; and affirmative action. For example, a greater proportion of other minority faculty than nonminority faculty agreed that access to new faculty positions may be limited due to the fact that minority faculty are not likely to be used to contact other minority candidates--(2.86 other minority and 4.00 nonminority). In addition, other minority faculty only moderately agreed (4.17) while nonminority respondents agreed (4.87) that minority and nonminority colleagues consult with one another. Other minority respondents tended to agree less than nonminorities that they have the same access to university opportunities--(4.13 other minority and 4.71 nonminority). It was evident also from the survey that there exists a question in the minds of

other minority faculty as to whether their departments ensure that minorities receive equal salaries among colleagues of equal abilities.

In combination, these observations suggest that the other minority faculty members tended to believe it is somewhat more difficult for minorities than nonminorities to gain an academic appointment at Penn State and to attain career advancement.

Black Faculty

Several items suggested that black faculty were greatly concerned about their disproportionate representation in the faculty ranks. Only a little over one percent of Penn State's faculty are black. There is also an apparent relationship between this small black representation and the findings of several items on the Bucking the Trend survey. Not surprisingly, black faculty tended to be less convinced than other faculty that all is being done that could be to recruit more minority faculty. The survey results showed that 52 percent of black faculty respondents were recruited by word of mouth from someone at Penn State; however, these same respondents did not agree (1.61-2.09) that minority groups, minority information networks, or minority faculty already at Penn State are used sufficiently to recruit additional minority faculty. Black respondents cited "the small number of minority faculty" as the most likely reason to contribute to their leaving Penn State, and they believed more than the nonminority group that Penn State would benefit by having more minority faculty--(5.69 for black faculty and 3.85 for nonminority faculty).

Perhaps the most telling survey results were those that indicated a greater sense of career uncertainty among black faculty than among nonminorities. For example, 71 percent of black faculty respondents on the tenure track and those already having tenure were uncertain about career advancement; yet, they prefer to make their careers at Penn State. Only 18 percent of

nonminority faculty responded in the same manner. Black faculty were more likely than nonminority respondents to characterize relationships with their colleagues as work-related associations with less likely social interaction. In addition, black faculty were less likely to agree that their ideas are valued by colleagues--(4.00 for black faculty and 4.54 for nonminority).

During a faculty member's career, he or she would expect to be given the same opportunity or rewards as colleagues of similar status. This may not be the case perceived by some black faculty members at Penn State. Black faculty respondents more than other respondents felt they would have to refocus their area of specialization to gain tenure (3.53 for black faculty and 2.40 for nonminority faculty). On average, more of their time is spent providing university services (20-29 percent black faculty) than the nonminority faculty (10-19 percent) while both faculty groups recognized that there is limited reward for university service. Black respondents tended to disagree that the department equally encourages and supports all faculty members toward achieving promotion and tenure regardless of sex or race, that minorities have equal access to other competitive university opportunities including appointments to administrative positions, and that their departments made an active effort to insure that minorities receive equal salaries among colleagues of equal abilities.

The significantly greater uncertainties about career issues expressed by black respondents suggest explicit problems that the University needs to address. These problems include:

- The need to further expand personal contact recruitment activities and to establish more extensive minority information networks.
- Consideration of establishing a formal mentoring system for new junior faculty members.
- Within appropriate standards of quality, provide adequately flexible review policies.

RECOMMENDATIONS AND CONCLUDING REMARKS

The Pennsylvania State University, like many colleges and universities, has attempted to meet its affirmative action obligation in part by advertising in all appropriate minority journals and other internal publications to attract minority faculty. And, like other institutions, affirmative action guidelines are in place to insure equal opportunities for all faculty. Nevertheless, if Blacks and other minority faculty are to truly have an equal opportunity for employment and advancement, strategies need to be devised to supplement these on-going affirmative action efforts.

From the analysis of the "Bucking the Trend" survey, three recommendations were prepared and submitted to Penn State's president. First, it was recommended that:

> Deans and department heads should (a) reassess the effectiveness of affirmative action recruitment methods, e.g., advertising in particular publications, and (b) reallocate appropriate resources within the college for providing recruitment incentives to expand the scope of affirmative action and increase the level of "personal contact" recruitment.

More faculty learned of an open position at Penn State through personal contact than by any other means. This was particularly true for black respondents. In contrast, advertising in professional journals or newsletters and in The Chronicle of Higher Education, and postings in graduate school departments were significantly less effective as means to recruit minorities. Data on file in the Affirmative Action Office regarding recruitment activities generally confirm the ineffectiveness of current advertising strategies.

Minority faculty also indicated in the survey their belief that departments do not make every effort to contact minority groups and minority information networks. The small number of black faculty currently employed at Penn State tends to provide at least partial evidence for this assertion.

If this recommendation is adopted, colleges and departments, in consultation with the Affirmative Action Office, will need to conduct a reassessment of their minority recruitment plans and programs. Using information on the effectiveness of various recruitment methods, funds will need to be reallocated from current recruitment programs to newly developed activities designed to increase the level of personal recruitment contacts with individuals in departments at other universities. Under this reoriented program, recruitment initiatives should not be limited to currently open positions, but should lay the foundation for future recruitment initiatives as openings occur.

The second recommendation addressed concerns for establishing a mentoring program. It was recommended that:

> College deans request department heads to initiate information meetings with tenure-track minority faculty members within their departments to discuss the desirability of mentoring relationships and to explore possible departmental guidelines for establishing a mentoring program.

All of the survey respondent groups at least moderately agreed that mentoring was important, however, the black faculty cohort more than agreed that a "formal" mentoring system for all new junior faculty members would be desirable. For the present, however, without more deliberate consultation with junior faculty members, insufficient information is available to warrant an unqualified recommendation for the development of a formalized mentoring program. It was felt that department heads should initiate an informal dialogue with tenure-track minority faculty members, and particularly black faculty members, to explore further the type of mentor relationships junior faculty might like to see encouraged. In addition, more information regarding mentoring programs, established or proposed, at other institutions, needs to be obtained to guide those individual

departments or colleges that believe a mentoring program would be an important service for new faculty members.

The third recommendation arose from a perception by minority faculty members, blacks in particular, that department heads were not aware of the full range of professional activities performed by some faculty members. Many faculty felt that not all of these activities were considered in promotion and salary increase decisions. It was recommended, therefore, that:

> College deans encourage department heads to become knowledgeable about an individual's outside professional as well as University activities. The review process for promotion and tenure, for salary increases and for other professional advancement opportunities needs to be flexible enough to consider the faculty member's full range of activities and responsibilities.

Responses to several survey items dealing with promotion, tenure, and professional advancement at Penn State suggested that black faculty more than other groups are uncertain about their career possibilities at Penn State. Because of their current limited numbers, the obligations of black faculty members to serve on numerous department, college and university committees require a considerable commitment to university service. The survey revealed that black faculty members reported spending a higher proportion of their time in such service than did other faculty. Accordingly, factors such as uncertainty concerning professional advancement opportunities and the level of expected University service have probably influenced the observations by faculty respondents that a more flexible review policy is needed. This recommendation does not imply that department, college, or university standards should be different for any particular group or individual. However, it does request that department heads take all responsibilities into consideration when making workload assignments and provide recognition for the additional obligations which stem from being

a member of an underrepresented group of faculty, whether it be a lack, female, or other faculty group.

Institutional research can play a vital role in providing timely and critical policy analyses for university executives. Recently, Fenske (1982) argued that greater emphasis on policy analysis is the only direction the institutional research function can take to become viable in the future. At Penn State, important policy questions were being asked about the status and effectiveness of minority recruitment and advancement opportunities. Penn State's Office of Planning and Budget, Planning and Research Group, provided the necessary survey and statistical expertise to assist university administrators and faculty representatives in conducting an analysis of faculty attitudes toward the University's affirmative action efforts. Since each recommendation was directed primarily at the college and department heads, a detailed version of this report was forwarded by the president to the Council of Academic Deans for their review and comment.

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USING MULTIDIMENSIONAL SCALING TO SUPPORT COMPETITOR ANALYSIS AND INSTITUTIONAL POSITIONING

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INTRODUCTION

A clear understanding of one's competitive environment is a vital component of an organization's strategic view of the world. This is as true for educational institutions as it is for profit-making corporations. For the multiuniversity, it is as essential (and complex) as it is for the large conglomerate. Competitive position is the underlying determinant of the success or failure of most viable strategic courses of action; it is a key factor in explaining current situational assessments. A profile of major competitors is one indication of an institution's image, and therefore an indication of the alignment of the public's perceived reality of the institution, versus the articulated or implicit mission.

It is, then, the ability to measure the differences between mission, perceived reality and relative competitive drawing power that makes a study of competitive position crucial. Marketing research techniques, such as those described in this paper, become the means for the institution to understand the client-public's perception, and therefore to perceive and describe the reality with which they must deal. In this respect, the logic inherent in utilizing the positioning methodologies is similar to that used in the application of any academic discipline.[1]

Boston University, because of the breadth of its academic programs and services, because of its physical location and because of significant changes

that have taken place since mid-century, suffers from a lack of image consistency. The spectrum of competitor institutions is as broad as its own academic portfolio. In order to better understand these complex realities and begin to isolate the actual dimensions of competitive force as they relate to the portfolio, the University has undertaken a serious attempt to understand the educational marketplace in these terms.

The seriousness of this undertaking is evidenced in several ways. Resources have been dedicated to the development of primary data on all levels of the student client market ("levels" meaning the transitional stages of the admissions recruitment chronology). Committee structures have been developed to provide a natural consumer of resulting analyses. Organizational changes, of the nature of the creation of the enrollment services "strategic unit", have been implemented with the intention of facilitating the adoption of the enrollment management mode of research, planning and implementation of prescriptive strategies.

The goal of these simultaneous developments -- and a working definition of positioning -- will be to arrive at the optimal balance between the existing institutional mission, institutional strengths and weaknesses, client-public perceptions (image), competitor positions and, ultimately, the client-public's desired benefits. While the statement of mission may or may not exist as a formal document, it is implicit in the current curricular structures, program offerings and executive philosophies. The remaining elements of the "strategic mix", while also qualitative in nature, require empirical support.

The non-metric scaling (an unsolved contradiction of terms)[2] of the qualitative competitor-related elements of the strategic mix can be achieved by means of multidimensional data representation techniques. This paper will

present an application of multidimensional scaling (MDS) techniques to non-metric attribute measurements. It will also demonstrate the role that multivariate analysis can play in supporting the interpretation of the MDS output.

METHODOLOGY

Research Design

Data analyzed in this paper are from a Spring, 1982 "Positioning Study," which was designed to obtain information on the desired benefits of a college education, and the degree to which Boston University and its competitors were perceived as offering those benefits. The study was representative of the University's primary market -- metropolitan regions in the Northeast Corridor -- and was targeted to the three groups that are generally regarded as critical participants in the college-choice process: prospective students, their parents and their guidance counselors.

The student and parent samples were drawn with equal representativeness from three institutional address files. Desirable prospects who had not inquired were randomly selected from the University's Student Search file; inquiries who had not applied and applicants were randomly selected from the appropriate files in the student record system. Guidance counselors were arbitrarily selected by virtue of the high schools they represented. Analyses discussed in this paper will be based on the total high school student sample.

Actual administration of the survey instrument was subcontracted to a research firm. As such, Boston University was never identified as the sponsor of the study, and a potential source of bias was eliminated. The survey administration consisted of two stages. First, an envelope containing items necessary for responding to an interviewer's questions was mailed to the

entire sample with instructions not to examine the materials, and that a researcher would be in touch with them shortly. Within a week interviewers contacted, by telephone, the required number of potential respondents. Responses were obtained from 613 high school students, 156 parents and 102 guidance counselors. Because this was a telephone interview, response rates were in the range of 95 to 100 percent, thereby eliminating non-response bias. The returns were found to be statistically representative of the population at less than the .05 level of significance.

Analytical Methods

The materials mailed to the sample members included a packet of cards with 17 distinct university "scenarios", each of which represented a fundamental positioning option. Also included was a card with 11 universities listed: Boston University and ten competitors. Exhibit 1 displays the scenario descriptors and the list of institutions studied.

Two examples of the scenario cards follow:

> Anyone would be proud to be a graduate or student of this institution: its graduates typically get the best jobs. It is an honor to attend this institution. Its degree is a major step to success.

> This institution requires a firm grounding in the liberal arts. All students must take the traditional program of courses in the humanities, social sciences, and the natural sciences. This helps to develop the intellectual skills needed to deal with the variety of demands in their professional and personal lives.

The descriptors for these two scenarios are "Prestige" and "Grounding in the Liberal Arts," respectively.

Respondents were asked to what institutions they had applied, in order of preference, to which they had been admitted, and where they most likely would

EXHIBIT 1

SCENARIO DESCRIPTOR	INSTITUTIONS STUDIED
a. Prestige of Institution	Boston University
b. One-to-One Counseling	Boston College
c. Faculty Degrees	Cornell University
d. Financial Assistance	Georgetown University
e. Professional Experience Outside the Classroom	Harvard University
f. Grounding in the Liberal Arts	University of Connecticut
g. Training for the Professions	Northeastern University
h. City of Boston	Syracuse University
i. Many Majors	SUNY (Combined)
j. Demanding Coursework	Tufts University
k. Interaction with Faculty	University of Massachusetts
l. Traditional Campus	
m. Teaching Faculty	
n. Athletics	
o. Social Life	
p. Selectivity	
q. Facilities	

be attending. They were then asked the extent to which they were familiar with the 11 institutions being studied. Next, they were asked to go through the deck of scenario cards and choose the five "institutions" that most appealed to them, and the five that least appealed to them. Finally, they were asked whether they associated each of the 17 scenarios with each of the 11 institutions. The attribution of the scenario descriptors to the competitor institutions provided the similarity measurements, which drive the various perceptual mapping techniques. A number of other descriptive questions were asked, which are not relevant to the topic at hand.

The power inherent in this tabular data scheme will be obvious to those who have worked with survey data. The limitations in applying multivariate techniques will be obvious to those who are familiar with the least squares algorithms. Although an approximation of a spatial configuration of competitor positions could be developed by hand using the nominal data, it is

unlikely that the more subtle patterns in the data could be uncovered without the aid of computer-assisted scaling techniques.

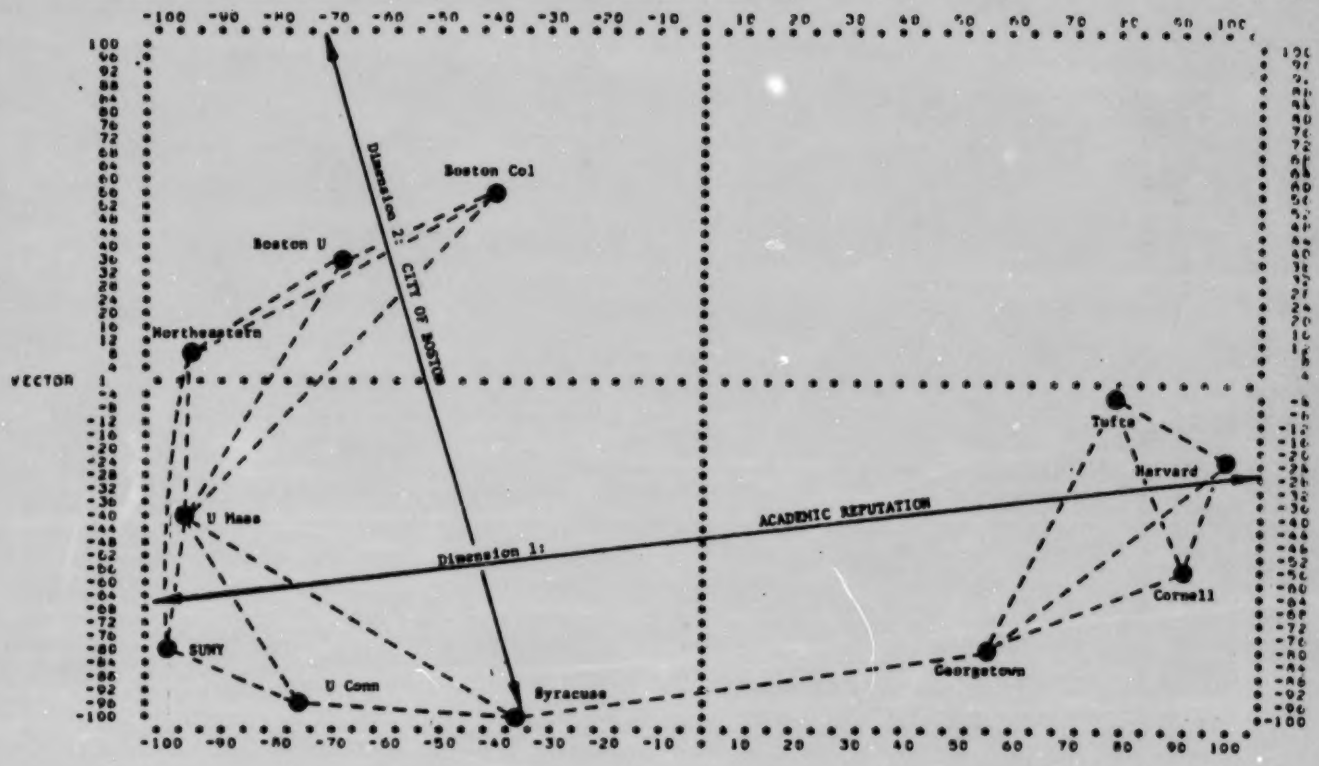
MDS routines have been developed to support (among other things) the subjective interpretation of dimensional solutions to non-metric based similarity and dissimilarity assessments. A correlation matrix is interpreted as a proximity measure, with the underlying concept being that the proximity data is directly transferable to Euclidean space. Because the MDS algorithms are iterative, rather than computational, their solutions -- coordinates for R dimensions -- are an optimization similar to those of linear programming applications. The objective of the routines is to preserve the rank ordering of the proximities (that is, to maintain monotonicity) while solving the puzzle of the spatial configuration. The difference between the original and the derived proximities (residuals) is measured in terms of (Kruskal's) stress. The MDS program which was used in these analyses was the Guttman-Lingoes' Smallest Space Analysis (1).

INTERPRETATION OF MDS SOLUTIONS

Figure 1 displays the MDS solution for R=2 (two dimensions). Note the horseshoe shaped pattern which indicates all proximity rankings of $R^2 = .3$. The superimposed vectors on Figure 1 indicate the author's subjective interpretation of what the dimensions might be: "Academic Reputation" and "City of Boston." The standard deviations of the attribution to the descriptors, "City of Boston", "Selectivity", "Prestige", "Faculty Degrees", and "Demanding Coursework" are significantly higher than the remaining 12, which supports this interpretation. The slope and intersection of the vectors on Figure 1 are also a subjective interpretation, and point out the fact that

PERCEPTUAL MAP OF BOSTON UNIVERSITY'S PRIMARY MARKET WITH TEN KEY COMPETITORS

FIGURE 1



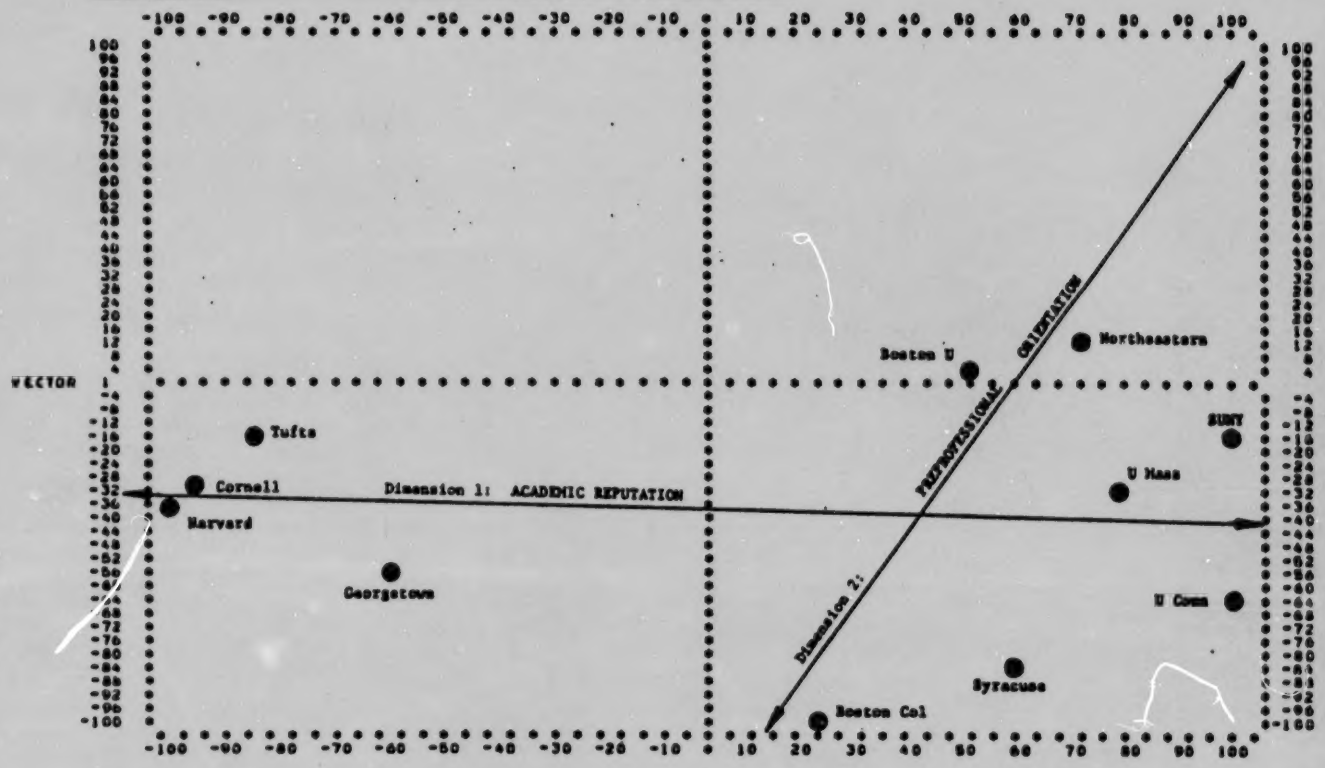
the x/y axes are for plotting purposes and do not necessarily indicate the actual position of the dimensions which are underlying the data.

Since the city of Boston is not a viable positioning alternative for about half the institutions studied, the scenario attributions were deemed to be strategically insignificant at this level of analysis. Ensuing analyses have excluded the "City of Boston" descriptor.

Figure 2 displays the MDS solution for R=2 excluding "City of Boston," with the dimensions again being subjectively superimposed. While the dimension, "Academic Reputation" is similar to that found in Figure 1, dimension 2 indicates a new ordering along what was tentatively deemed to be "Preprofessional Orientation."

PERCEPTUAL MAP OF BOSTON UNIVERSITY'S PRIMARY MARKET WITH TEN KEY COMPETITORS

FIGURE 2



Note that the solution displayed in Figure 2 shows a slightly more well-confined set of two clusters. A discriminant function analysis (DFA) was applied to the two "groups" to gain further insight into the variables which had contributed to this clustering. The significant variables, with their discriminant coefficients, are ranked below from negative horizontal positioning to positive.

-11.2	Training for the Professions
- 9.6	Faculty Degrees
- 5.6	Social Life
+ 0.4	Teaching Faculty
+ 3.0	Many Majors
+ 4.2	Demanding Coursework
+ 5.0	Grounding in the Liberal Arts
+ 5.5	Professional Experience Outside the Classroom
+11.9	Facilities

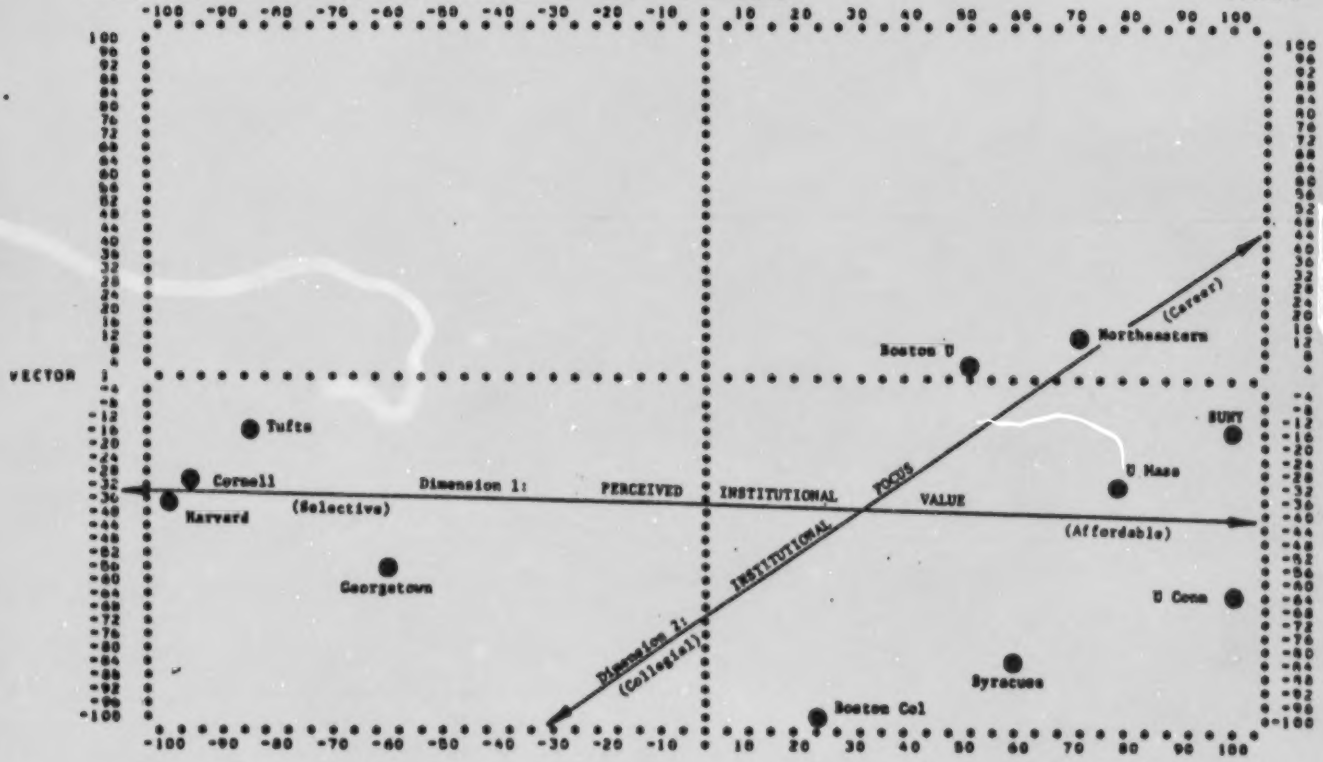
Although these data might indicate a single dimension of "Classical Training" versus "Experiential Training," further support from multivariate analysis was required to reinterpret the two dimensions in light of this new potential framework.

A frequent approach to interpreting MDS dimensionality is through linear multiple regression. The MDS vector coordinates are regressed over the attribution data to infer which variables explain the dimensionality (and what the slope of the dimensions should be). A stepwise regression indicated that dimension 1 was affected by the attributes "Selectivity" (-) and "Financial Aid" (+), and might now be interpreted as "Perceived Institutional Value." The opposite poles of the dimension may both be interpreted in a somewhat positive light, with the negative pole being very selective (and very expensive) and the positive pole being very affordable (but not so selective). Dimension 2 was affected by the attributes "Interaction with Faculty" (-), "Athletics" (-) and "Professional Experience Outside the Classroom" (+), and is now interpreted as "Institutional Focus." The opposite poles of this dimension can be read as collegial focus (on the negative side) and career-oriented focus (on the positive side). Figure 3 displays these new interpretations.

Worth highlighting is the position of the two dimensions relative to each other. There appears to be, in the minds of the student clientele, a correlation between a collegial institutional focus and selective institutions. Perhaps more important to Boston University is the antithesis of this perception; a career-oriented focus is not perceived as taking place at selective institutions. Stemming from this assessment of the dimensionality are a number of issues that are pertinent to ongoing discussions of the University's positioning strategies.

PERCEPTUAL MAP OF BOSTON UNIVERSITY'S PRIMARY MARKET WITH TEN KEY COMPETITORS

FIGURE 3



This solution, as interpreted, presents Boston University's primary market in a pattern that is intuitively appealing and in terms that are relative to institutional planners and strategic planning techniques. Further statistical support through factor analysis did not prove to be feasible due to the lack of a strong metric base (i.e., high communality of the nominal attributions). MDS solutions of greater dimensionality did not show a significant enough reduction in stress to warrant attention.

There remains a great deal to be said about the validity of a design such as this, and the potential to probe deeper via higher levels of dimensionality or with other multivariate support techniques (especially multiple regression). Alternative perceptual mapping techniques, such as factor analysis and

discriminant analysis, have their strengths and weaknesses when compared to MDS; they are generally related to the nature of the data to be analyzed.[3] Such a discussion is beyond the scope of this paper. This design is presented as a fairly inexpensive and relatively easy to use approach to perceptual mapping.

IMPLICATIONS

Insights gained from the perceptual maps displayed in this paper, and others not shown here, have serious implications for Boston University's future strategic course of action. Further strategic interpretation of the maps must be grounded in other inferences obtained from the Positioning Study, which have not been discussed here. The user of these methodologies must understand the need to go beyond the level of analysis presented here and replicate the solution for each of its key market segments. Included in this stratification scheme should be perceptual assessments of each level of the recruitment chronology.

A reading of the desirable course an institution might want to pursue as it attempts to move itself across perceptual space must account for an understanding of which market segments al ign themselves with the various educational benefits studied. Although these data were readily apparent in the complete analysis, Boston University is not willing to share this information until decisions affecting our own future are finalized and implemented. What has become apparent as a result of this analysis is the need to measure the congruence between an institution's mission and the feasibility of implementing strategies which will contribute to the development of that mission, in light of a new understanding of the marketplace.

FOOTNOTES

1. George Zimmerman, "Basic Research: Aesthetics of Pure Science." The World at Boston University, 29 September 1982, p. 2, col. 1.

2. Louis Guttman, "What is not What in Statistics," in Multidimensional Data Representations: When and Why, ed. Ingwer Borg (Ann Arbor: Mathesis Press, 1981), pp. 44-45.

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The Development Saga of an Institutional Research Database at a State College

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Public colleges and universities have become increasingly pressed in recent years to provide ever more complex, reliable, timely and accurate data about their institutions, particularly students' entering characteristics, college progress and college outcomes. During the same period colleges, like other complex institutions, have progressed in the development of planning, information management and evaluation systems. However, these development efforts have largely focused on expansion planning and automated data processing while devoting less attention to strategic planning and management information systems.

The purpose of this paper is to describe the development of an institutional research database which supported planning, management and evaluation activities at a multipurpose state college. With additional funding support from a Title III SDIP Grant, the Office of Institutional Research was expanded to improve the efficiency and effectiveness of the College's systems for planning, information management and evaluation review processes. These highly interrelated systems were intended to contribute significantly in developing and implementing the institutional mission in the 1980's. The intended result was to strengthen an institutional research function responsive to the increasing planning, research and evaluation needs of the College community.

The Preparation Process

A highly participative Self-Study process in preparation for a reaccreditation visit and a long-range institutional planning effort increased the campus community's awareness of the importance of accurate and consistent information on profile characteristics of the college's students, faculty and programs. Increasingly complex external reporting and program evaluation requirements provided additional press to develop systems which would provide more easily accessible information on various institutional characteristics, particularly the entering characteristics, persistence and performance of specific student groups.

Initial efforts pointed out the difficulties of the present operating system to provide management information for research and planning purposes. The following conditions were especially noted:

1. Accurate information sometimes was unavailable, either because it was not collected by a specific operating area or, if collected, was collected in a form not particularly useful.
2. Information produced by one file on occasion conflicted with that produced by another unit's file.
3. Documentation and procedures in generating data files sometimes contributed to the collection and storage of inaccurate or missing data.
4. The lack of file documentation and data-element definitions led to confusion in identifying and utilizing appropriate information sources.
5. Many research and planning issues required data elements from

several operating units and/or data files.

These conditions produced a felt need within administrative circles to begin a process of creating a series of management information systems which would provide user-friendly access and would be less manual labor intensive. Because student-related aggregate data are most often sought and most difficult to obtain at the level of analysis sought, initial efforts were concentrated on the development of a longitudinal student databank system as an institutional research resource.

While vast amounts of student data are collected and electronically processed, they tend to be neither carefully maintained nor greatly utilized for planning and decision-making processes. Accurate information needed for planning and policy determination often tended to be neither readily available nor consistent among source providers. Documentation and procedural guidelines were found to be neither adequate nor widely understood across administrative units. These factors served to have administrators 1) often misunderstand or mistrust the information they did receive, and/or 2) be perplexed as to whether needed information existed or, if so, where to obtain it.

Organizing the Effort

Through funding from the Title III Grant, additional research staff and computing equipment were acquired, as well as the services of two consulting agencies.

Responsibility for the development effort was placed primarily with the Office of Institutional Research with the intended involvement of the Computer Center and other data providers and users.

The organizing role of the institutional research office seemed legitimate because it could provide a unique institution-wide perspective. The institutional research office tends to use data from many of the operating systems and often has need to integrate data from diverse sources. As Dressel (1972) has noted nearly a decade ago, the institutional researcher seems to be in the best position to be generally knowledgeable about the structure and content of the basic operating data systems and their importance as a college-wide resource.

Two consulting agencies comprised a highly qualified team with top academic management and technical computer competencies attempted to facilitate the process by helping to generate broad administrative support for the approach as well as specific procedures and suggestions on implementing the project. A management plan for the Office of Institutional Research, which included a clarification of office functions to support institutional research and planning, information management and evaluation systems, attempted to clarify its role and function, and provided further legitimacy for institutional research to take prime responsibility for the databank's development and utilization.

The Computer Center is another administrative unit within the college which has the potential for a college-wide perspective on at least those data which are gathered and electronically processed by various operating units. The Center provides a central role not only in data processing, but increasingly in the logical structure and design of the various transaction data files maintained by major offices such as admissions, registrar, and financial aid. The consultant team attempted to develop a management plan for both the Office of Institutional Research and the Computer Center. This

intervention was intended to provide a model for the functional relationship between these two central units and thus facilitated the development process.

Although the institutional research office and Computer Center have a general overview of the interrelationships among most of the data providers and users, no single unit can be expected to have an in-depth knowledge of every specific operating area or data system. Data user and provider groups have the greatest insight and understanding of specific data required or available in their areas of responsibility. Thus, there seemed to be a need to involve knowledgeable representatives in the development process; guidance was sought from a small working group composed of individuals with some institution-wide perspective and extensive familiarity with a particular data provider or user area. Such a group was quite instrumental in clarifying the information needs of major potential users of the databank and the most reliable sources of primary data elements. Their participation in the development process was intended to reduce the reluctance to share data ownership and gave impetus to efforts to maintain accurate and complete operating data files.

Findings and Conclusions

Several major findings about the nature and use of data have emerged from the development process which may have generalizeability to similar institutions. They are:

1. Top administrators seem to have little understanding of the information potentially available to them and thus they have difficulty articulating their information needs for strategic planning and

decision-making.

2. There seems to be little administrative interest in and hence no mechanisms for the systematic collection of information external to the institution, with the exception of a growing conern about enrollment projections.
3. Vast amounts of student information are collected and stored on various data files with considerable redundancy and inconsistency.
4. Although considerable labor intensive efforts are expended in collecting data, especially student data, relatively little attention is given to its storage and updating, nor to its utilization in stratigic planning and policy determination.
5. Because the individual data systems generated by several operating units have been designed as transaction systems to meet the specific purposes of the unit, there are considerable feelings of ownership for those data with little realization of their potential importance for other institutional uses.

Moreover, the process has also illustrated several opportunities and pitfalls for the institutional research functions. These conclusions are the following:

1. The role of influence of institutional research in strategic planning and management information is very much determined by the commitment of the institution, especially its top administrators, to data-based planning and the proximity of the institutional research function to that planning process.
2. While institutional research has the potential for an institution-wide information brokerage role, it's sphere of influence is often

consciously restricted by the reluctance to share data ownership by operating units.

3. Although great expectations are raised, a specific management information system will not anticipate and be responsive to all the information of major decision-makers. Its purpose and limits should be clearly delineated at the start.

4. There is considerable need to balance the efforts devoted to a long range effort with the production of routine and immediately helpful information. If not, there is considerable risks that support for the development effort will be withdrawn before it's intended results can be produced.

5. While the cooperation and commitment of the Computer Center and other administrative units are vital to successful completion, institutional research staff must develop enough technical competance to maintain sufficient locus of control assuring some degree of successful completion.

The specific approach in the development of the information system described here may be idiosyncratic to the pilot institution or its sister institutions within the state. Nonetheless, the processes and findings from this effort may have considerable generalizeability to colleges and universities attempting to improve upon their management of student information systems which efficiently respond to increasingly complex reporting requirements and policy issues.

Reference

Dressel, P.L. et al. Institutional research in the university: A handbook. San Francisco: Jossey-Bass, 1972, 188-189.

PROJECTING ENROLLMENTS AT SMALL COLLEGES
(The Role of the Institutional Researcher)

Randall Draper
Director of Institutional Research
Johnson State College
Vermont

The setting is any small college with an enrollment of up to 1500 students and an incoming class of about 500. The college faces increasing difficulty balancing it's budget in an era of shrinking resources and a declining student pool. Tough decisions need to be made about curriculum, personnel, capital projects, and even maintenance.

The problem is a lack of consensus about expected enrollments among the key offices of admissions, financial affairs, the registrar and the president. This situation leads to inaccurate enrollment projections, poor planning, and inevitable financial shortfalls and surpluses.

To those of us trained in large research institutions, and who make a living collecting and analyzing data, the solution is simple: develop an "information rich environment" through a computer-based management information system. In other words, a terminal for every administrator and a programmer for every terminal. (Not to mention a word processor for every secretary.)

Unbelievably, some administrators are skeptical. They argue that the size of the college doesn't demand such a scientific approach to planning. After all, "this isn't the state university. We know from experience what to expect from day to day and year to year. If we want to know what students are planning, we'll just ask their guidance counsellors."

Perhaps you recognize the classic confrontation between the scientists and wizards of management.

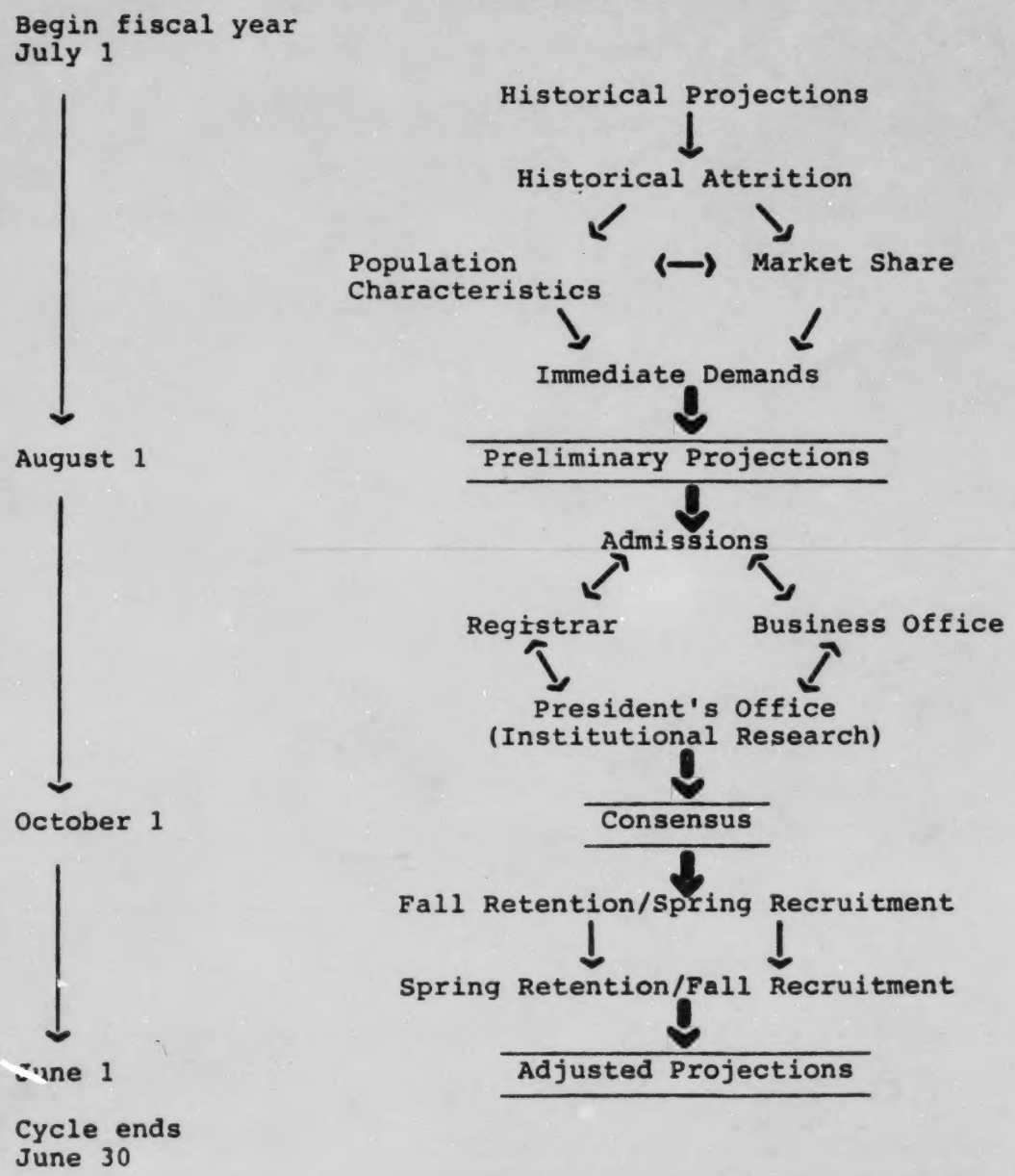
The following paper argues that the solution to poor enrollment

projections lies not in science nor wizardry, but in politics. In effect, small college institutional researchers should probably spend 25% of their time collecting data, 25% analyzing that data, and 50% reporting, interpreting, and seeing to it that the resultant information gets used. At all costs he or she should avoid getting lost in the process of data collection and storage. A little knowledge goes a long way and doesn't demand sophisticated instruments or machines.

The following example of a modest, perhaps unsophisticated, enrollment projection system serves to illustrate the point. The "system" includes three components: preliminary projections, the development of consensus, and year-long "adjustments" based upon a close monitoring of recruitment and retention.

NEAIR
October '82

Predicting Enrollments at a Small College



PRELIMINARY PROJECTIONS

This component begins with the accumulation of base-line data on past enrollments and student characteristics supported by a close monitoring of external and internal influences on the student market, e.g. the size of the student pool, or curriculum changes. Specifically,

A. Historical Projections:

Statistical analysis of enrollment trends either by "regression", or comparison of average changes semester to semester and sub-group to sub-group. (e.g. state residence, academic major, on campus/off campus)

B. Historical Attrition:

The weighted average of dropouts by class over at least a four year period.

C. Market Share:

The identification of primary and secondary markets based upon the geographical source of inquiries, applications, deposits, and registrants.

D. Population Characteristics:

The profiles of incoming, outgoing, and graduating students by number, age, sex, residents, major, etc.; the analysis of the student pool by number of high school and junior college graduates within primary and secondary market areas by age, sex, academic and career interests, etc.

E. Immediate Factors:

The effect of local and national economy on career patterns and financing an education; expansion or contraction of specific college programs; institution of new marketing strategies, etc.

The assembly of the above information depends on the availability of existing data at the college, and from local, state

and national agencies. Be advised that it is never as comprehensive, organized, nor accurate as expected. Very often, especially at smaller institutions, the process is tedious and time consuming. Be prepared to take up residence in the Registrar's Office.

CONSENSUS

The second component, achieving consensus, is deceptively simple, yet often ignored because of internal politics or poor communications.

The key to achieving consensus is the establishment of clear definitions and the existence of a medium through which to compare expectations.

Among many, the key concepts to be defined are:

Freshman	Freshman
Transfer	Sophomore
Former Student	Junior
Leave of Absence	Senior
Returning Student	Retention
Unsure Student	Attrition
Exiting Student	In-State Student
	Out-Of-State Student

The natural medium for achieving consensus is the Office of Institutional Research, or more specifically, the institutional researcher skilled in communication and negotiation. In essence, the researcher's job only begins with the development of preliminary projections. Accurate projections in the absence of clear understandings and mutual agreement among the key officers of the college is a purely academic endeavor.

Therefore, the successful institutional researcher will commit at least one third of his or her time to reporting, explaining and evaluating the use of information. Researchers at smaller colleges should spend less time building complicated Management Information Systems and more time managing information.

ADJUSTED PROJECTIONS

The agreed upon enrollment projection is monitored systematically through a series of weekly, bi-weekly, and monthly reports that compare goals and expectations with actual recruitment and retention.

A. Recruitment (Appendix A_1, A_2):

These two reports are assembled every Friday after the final delivery of mail. They are distributed to key administrators before the end of the workday and then discussed at the President's staff meeting Monday morning.

The reports enumerate the number of applications, acceptances, deposits, and withdrawals of deposits received during the week ending Friday and compare the cumulative totals to the previous year's total to date and final enrollment. Of particular interest is the column indicating the number of deposits received after the date of the report the previous year. A comprhensive report comparing the last four years week by week is distributed at the beginning of the recruitment cycle.

B. Retention (Appendix B_1, B_2):

The pool of active and eligible students is identified name by name in an accounting analysis pad and a set of "unobtrusive measures" of their future plans are reviewed regularily, eg. preregistration, request for transcripts to be forwarded, forwarding addresses left at the mailroom, and hearsay evidence from faculty and staff. Subsequently, a decision is made as to each student's intentions to return or to exit based upon previously agreed upon decision rules, eg. preregistration and one other piece of supporting evidence classifies the student as a "returner." This information is reported to the President's staff biweekly.

Towards the end of each semester and once during the summer faculty contact any of their advisees about which insufficient information exists to make a decision. This serves to clarify projections as well as act as an excellent retention tool.

C. Measuring Progress (Appendix C):

Once a month progress towards both budgetary and College goals is reported in a format that outlines the best and the worst potential outcomes.

The "least to date" column includes only those students definitely expected to return and those on a Leave of Absence that have preregistered while "most to date" counts "unsures" and all LOA's eligible to return. In both cases, only former students, transfers, and freshmen with deposits are counted.

To summarize, accurate enrollment projections are no less important for the small college than for the large university. Unfortunately, often the tendancy is for institutional researchers to overcomplicate the process while administrators oversimplify it. The solution is for institutional researchers to become more than purveyors of information and to enter the political process at their institution. This can be accomplished through the development of a straight forward process for enrollment projecting which enables the researcher to spend more time working towards consensus and assessing the viability of budgetary and college coals.

APPENDIX A_1

(802) 635-2356

Weekly Statistics Reports for Fall/Summer/Spring 198_____
Week Ending Friday, _____, 198_____

Week's Activity	Cumulative at End of Week	Compared to_____198
Total Apps. Rec'd: ____ VT: M: OOS: F: F: T: FSR:	ACTIVE APPLICATIONS Total: ____ VT: M: OOS: F: F: T: FSR:	ACTIVE APPLICATIONS Total: ____ VT: M: OOS: F: F: T: FSR:
Total Apps. Accpt: ____ Vt: R: OOS: A: F: P/A: T: EDP: FSR:	ACCEPTANCES Total: ____ VT: R: OOS: A: F: P/A: T: EDP: FSR:	ACCEPTANCES Total: ____ VT: R: OOS: A: F: P/A: T: EDP: FSR:
Total Deposits Rec'd: ____ VT: R: OOS: A: F: P/A: T: EDP: FSR:	DEPOSITS Total: ____ VT: R: OOS: A: F: P/A: T: EDP: FSR:	DEPOSITS Total: ____ VT: R: OOS: A: F: P/A: T: EDP: FSR:
Total Withdrals. Rec'd: ____ VT: R: OOS: A: P/A: EDP:	WITHDRAWALS Total: ____ VT: R: OOS: A: P/A: EDP:	WITHDRAWALS Total: ____ VT: R: OOS: A: P/A: EDP:

APPENDIX A_2

	FINAL ENROLLMENT FALL 1981	DEPOSITS TO DATE FALL 1982	DEPOSITS RECEIVED AFTER THIS DATE LAST YEAR
First-time Freshmen			
In-state			
Out-of-state			
Total			
Transfers			
In-state			
Out-of-state			
Total			
FSR			
In-state			
Out-of-state			
Total			
Subtotal			
In-state			
Out-of-state			
Total			
EDP			
In-state			
Grand Total			
In-state			
Out-of-state			
Total			
NEBHE			

APPENDIX B_2

RETENTION REPORT*

FOR FALL/SPRING _____

Date:

IN STATE

	Returning	Unsure	Not Returning	Total number eligible to pre-register
#				
%				100

OUT STATE

	Returning	Unsure	Not Returning	Total number eligible to pre-register
#				
%				100

COMBINED

	Returning	Unsure	Not Returning	Total number eligible to pre-register
#				
%				100

*working report

APPENDIX B1

In State	Pre-registered	Room reservation	Dismissal	Leave of Absence notice	Exit Interview	Request for transcripts - Registrar	Request for transcripts - Financial Aid	Incomplete financial aid applications	Mailroom	Advisor Grapevine: May be leaving	Advisor Grapevine: Definitely leaving	Decision: R	Decision: ?	Decision: NR
Name														
Address														

APPENDIX C

PROJECTED ENROLLMENTS

Date:

	Budget Goals	Least To Date	College Goals	Most To Date
Returning Students				
LOA's Returning				
FSR's				
Transfers				
Freshmen				
TOTALS				

INSTITUTIONAL SUPPORT COSTS: A COMPARATIVE STUDY

John A. Dunn Jr., Vice-President, Planning, Tufts University

ABSTRACT

This study analyzed the relationship of six institutional characteristics to institutional support expenditures. The share of operating budgets spent on executive management, fiscal and information services, logistical services, and community relations and fund-raising, was found to be inversely related to total budget size for a sample of thirteen independent moderate-sized universities.

BACKGROUND

It is instructive, in assessing how well a college or university is managed, to ask what share of its resources go into internal administration and support activities. While such expenditures are essential, they use dollars otherwise available for teaching, research, financial aid or other needs.

There are no commonly accepted standards for the amount which should be spent on "institutional support." Spending too much diverts resources from the institution's primary missions; from the faculty's point of view, anything is too much. Central administrators argue, on the other hand, that cutting resources back too far may curtail needed direction and support, and may damage the institution over the long run. Tufts undertook the study of expenditure patterns as part of its long-range budget planning.

METHODOLOGY

Twelve other colleges and universities viewed as being roughly similar to Tufts in several important ways were selected for the study: Boston College, Boston University, Brown, Dartmouth, Emory, Georgetown, Johns Hopkins, Princeton, Rochester, Vanderbilt, Washington University, and Yale. All are independent institutions; all are universities with both graduate and professional schools; and all are of moderate size, at least as compared with some public university giants.

Three direct and three derivative measures of institutional characteristics were thought to be related to institutional support expenditures. The direct measures, total budget, total FTE enrollment, and number of degree programs, seemed to be measures of institutional size and scope. The percent of enrollment constituted by undergraduates was a derived measure of concentration on undergraduate education. The other derived measures were number of students per program, which gauged institutional complexity, and budget per student, which constituted a crude composite measure of institutional wealth and of program mix, including the presence of substantial sponsored research. Data collected from the registrars of the institutions sampled are shown in Table 1.

Table 1: Institutional base data, 1981/82

Institution	Oper Budget $000	FTE Students	Budget/ Student $	% Undergr	Degree Programs	Studs/ Program
Boston Coll.	96,701	17,430	5,548	71	8	2,179
Boston Univ.	264,666	27,042	9,787	48	14	1,932
Brown Univ.	111,429	6,914	16,116	77	6	1,152
Dartmouth	103,849	4,389	23,661	80	5	878
Emory	82,862	8,154	10,162	52	9	906
Georgetown	150,522	13,652	11,026	50	8	1,707
Johns Hopkins	267,492	9,904	27,008	47	7	1,415
Princeton	227,000	6,101	37,206	74	3	2,034
Rochester	191,083	8,966	21,312	56	8	1,121
Tufts	101,837	6,441	15,811	68	11	586
Vanderbilt	105,988	8,942	11,853	61	10	894
Washington U.	176,106	10,804	16,300	63	9	1,200
Yale	327,500	10,097	32,435	51	8	1,262

Questionnaires were sent to the twelve universities; telephone interviews were conducted for clarification. The questionnaires requested schools to provide 1981/82 budget data, following the NACUBO chart of account definitions wherever possible. A copy of the questionnaire and

instructions is available from the author, on request. In the interests of comparability, several editorial modifications were required:

- where senior-level salaries were lumped in a single account rather than attributed to functional groupings, they were reassigned based on numbers of people in each function, after consultation with respondents;
- functions were rearranged to resemble the author's institution where there were significant differences;
- operating expenditures for hospitals were eliminated from total institutional expenditures;
- in one instance, 1982/83 budgets were supplied and reduced to 1981/82 levels after discussion with the respondent.

Institutions were asked to be as inclusive as possible, regardless of how they report internally, so as to be sure that comparable expenditures were identified. For instance, fund-raising expenditures on capital campaigns are sometimes written off against capital receipts instead of against operating incomes; wherever possible, such expenses were included here. Thus some institutions will show higher support expenditures here than those shown in their own accounting.

Comparability in executive management expenses was relatively good. In fiscal affairs, differences in treatment of data processing made it useful to construct a "fiscal affairs and information services" grouping, rather than segregating those elements. Logistical services were extremely difficult to compare; only a few common elements were selected for comparison. Finally, in community relations and development, differences in titles and functions make assurance of comparability difficult. Appendix A shows in more detail the elements grouped in each category.

Derived measures were constructed for the data and relationships were analyzed with correlation and regression techniques. SPSS subprogram regression was used for this purpose.

RESULTS AND DISCUSSION

For executive management, fiscal and information services, certain logistical services, and community relations and development, the institutions sampled spent between 4.8% and 10.7% of their operating budgets, as shown in Table 2.

Table 2: Percentage of Institutional Operating Budget Spent for Institutional Support, 1981/82

	Exec Mgmt	Fiscal & Info	Logist. Svcs	Subtotal	Community Rel & Dev	Total
High	2.6	3.1	2.4	7.4	4.7	10.7
Mean	1.4	2.2	1.6	5.2	2.3	7.6
Median	1.4	2.1	1.6	4.9	2.0	7.7
Low	.7	1.4	.8	3.6	1.1	4.8

The distribution of budget shares spent for the institutional support elements is shown in Figure 1. For fiscal and information services, shares tended to be closely grouped; for community relations and development expenditures, they were widely dispersed.

An exploration of the simple correlations (Table 3) between the institutional characteristics and budget shares for institutional support components shows that the larger a university's total budget, the smaller the share for institutional support. A possible explanation is that each institution, large or small, requires certain minimum levels of support; beyond that base, support expenditures grow less rapidly than total budgets. This relationship holds for overall institutional support and for each of the components except fiscal and information services, where the relationship is too weak to be significant.

The proportion of undergraduate students to total enrollment is related only to development expense. It may be that heavily undergraduate universities may depend more substantially on fund-raising incomes than do those with higher proportions of graduate and professional schools where research income may be more significant.

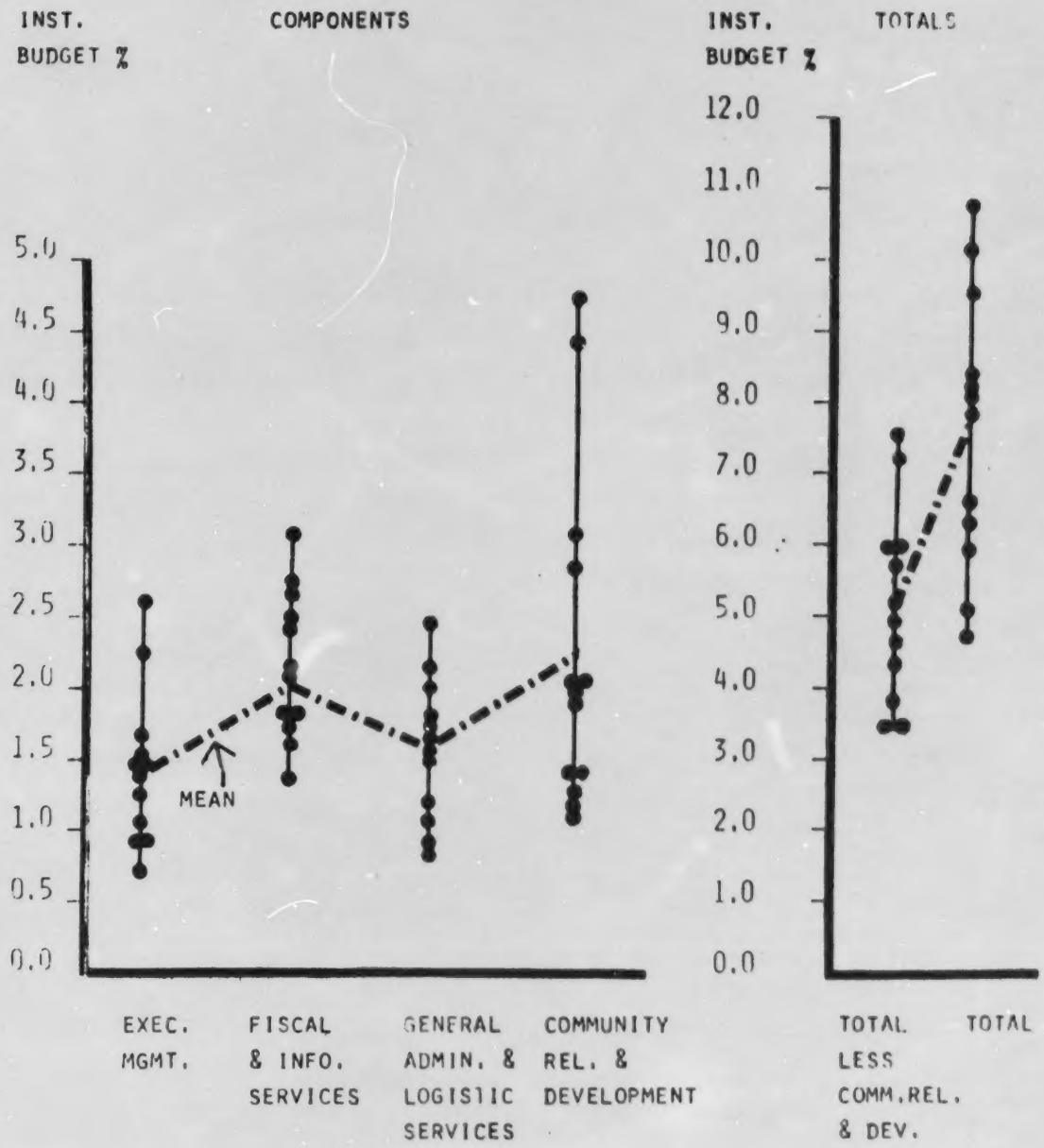
The more degree programs an institution offers, the larger its budget share for fiscal and information services. Evidently, where there are many programs and deans, there is a need for more (and more widely available) financial and managerial data than in less complex institutions.

FIGURE 1

INSTITUTIONAL SUPPORT COST ANALYSIS

SUMMARY OF COMPARABLE ELEMENTS

PERCENT OF TOTAL OPERATING BUDGET SPENT



Budget per student, as noted earlier, is a crude measure, relating in part to institutional wealth, but also to the mix of programs, and to the presence of significant research expenditures. It seems clear that the bigger an institution's budget is in relation to the number of students it has, the smaller the share of its budget that goes for executive management and fiscal and information services. There does not appear to be a relationship between budget per student and development expenses or logistical expenses.

The number of degree programs, total enrollment, and number of students per program do not appear to be broadly useful as predictors of institutional support expenditures.

Table 3: Pearson correlation coefficients between institutional support expenditures and institutional characteristics

Variable	% on Mgmt.	% on Fiscal	% on Logist.	% on Devel.	Subtot exc Dev.	Total Percent
Budget	-.58 *	-.40	-.51 *	-.65 **	-.59 *	-.79 **
Total FTE	.36	.52 *	-.40	-.47	.21	-.17
% undergrad	.09	-.02	.02	.65 **	-.02	.38
$/student	-.79 **	-.75 **	-.17	-.11	-.67 **	-.45
Programs	.39	.50 *	-.08	-.07	.33	.18
Stu/program	.13	+.29	-.25	-.56 *	+.06	-.32

Correlations marked * are significant at the .05 level.
Correlations marked ** are significant at the .01 level.

The mutual contributions of the six institutional characteristics in explaining differences in institutional support shares were examined with multiple regressions. Initially all six factors were included, but the results were inconclusive. Based on the simple correlations shown above, it was thought that the overall budget and budget-per-student variables may have interacted in such a way as to confound the analysis. Hence the latter variable was left out and a second set of analyses performed.

Taken together, the five variables -- total budget, students per degree program, number of programs, total enrollment, and percent undergraduate -- explain most (78%) but not all of the variance in institutional support shares between institutions (Table 4).

Table 4: Multiple regression F-ratios and other statistics omitting budget-per-student

Predictors	Subtotal of executive, fiscal and logistical services	Total institutional support services
Students per program	6.932 *	1.860
Number of programs	4.638	2.997
Total budget	16.307 **	7.503 *
Total enrollment	3.049	1.580
Percent undergraduate	.739	.912
F overall	5.425 *	4.144
R^2	.82	.78

* = significant at the .05 level.
** = significant at the .01 level.

In this analysis, total budget clearly emerges as the most powerful predictor of the percent spent on institutional support.

Further analysis of the relationship between budget and institutional support shares was undertaken. After experimenting with a number of curvilinear relationships, the log of budget was found to be a better predictor of institutional support budget shares than was the absolute value. The results of the linear and logarithmic regressions are shown in Table 5, and the resulting logarithmic curve is depicted in Figure 2.

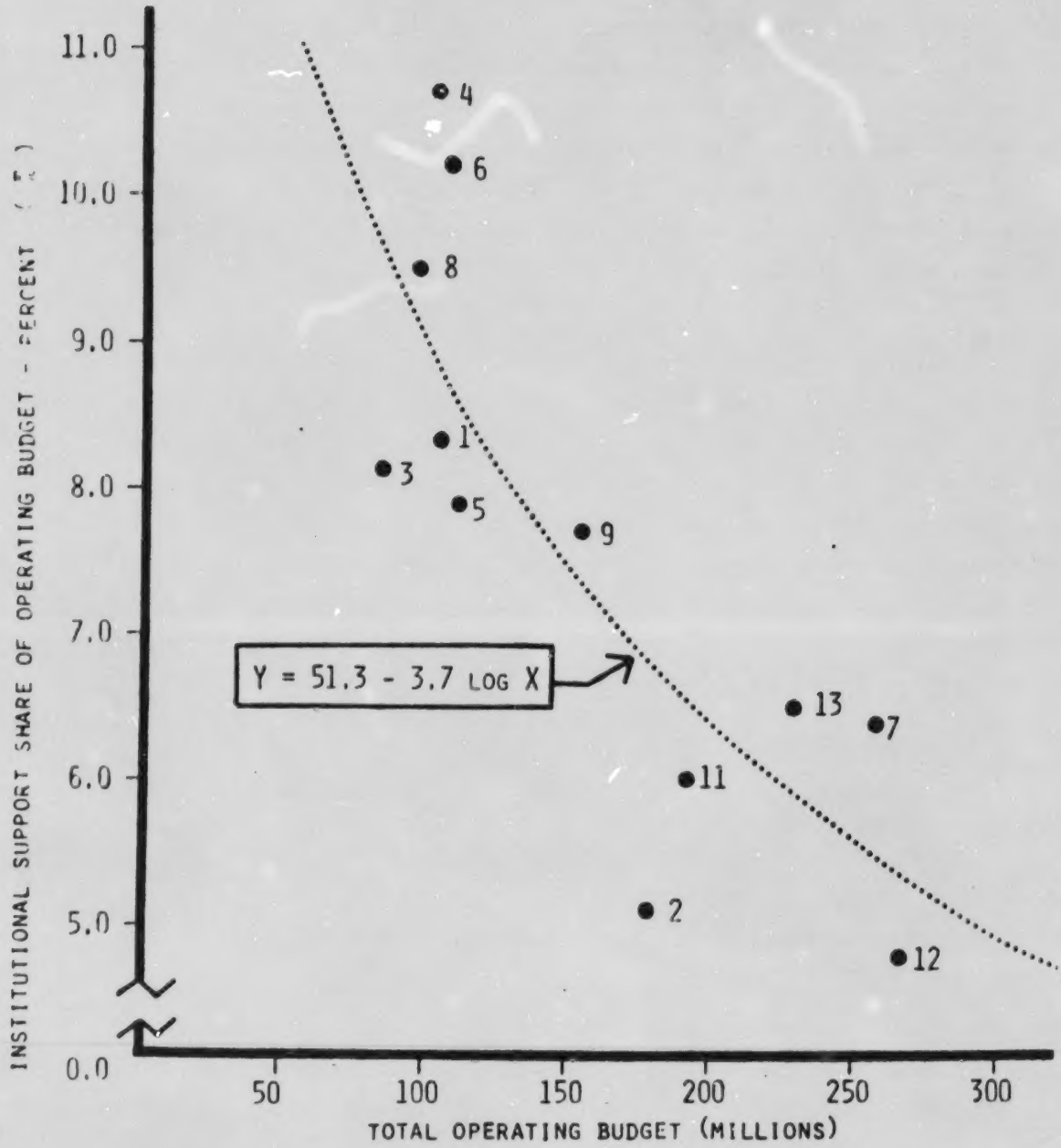
Table 5: Linear and logarithmic regressions

Item	Subtotal of executive, fiscal, and logistical services	Total institutional support services
Linear regression: (y = a + bx)		
a	6.93	11.07
b	-.00001	-.00002
R^2	.34	.63
F	5.25 *	16.69 **
Logarithmic regression: (y = a + b log x)		
a	27.28	51.29
b	-1.86	-3.68
R^2	.37	.65
F	5.87 *	16.69 **

* = significant at the .05 level
** = significant at the .01 level

FIGURE 2

RELATIONSHIP BETWEEN OPERATING BUDGET AND PERCENT SPENT ON INSTITUTIONAL SUPPORT: SCATTER PLOT AND BEST FITTING LOGARITHMIC CURVE



Four of these universities paid all institutional support costs out of general revenue; four charged back all costs to schools or other cost centers; the remaining five pursued a mixed strategy, meeting some costs out of general revenues but charging others to cost centers.

Although the institutional characteristics identified in this study explained much of the variance in institutional support spending, it is clear that there are other factors at work which this study did not capture. Future studies might investigate such items as urban vs. rural location; single vs multiple campuses; centralization vs. decentralization as a management style; research as a share of total budget; relative stability of the institution vs. rapid growth and development; presence or absence of major capital campaigns; and continuity of leadership vs. rapid changeover of senior personnel.

ACKNOWLEDGEMENTS

Gratitude is expressed to Steven S. Manos, Tufts Executive Vice-President, who identified the need for the survey and read early drafts; to Dr. Leah R. Hutten who prepared the statistical analysis; to Elizabeth A. Cooper who prepared the tables; and, most importantly, to the respondents in the institutions surveyed, without whose willing and intelligent cooperation the study would not have been possible.

APPENDIX A: INSTITUTIONAL SUPPORT EXPENDITURE DEFINITIONS

Executive management includes:

- governing board (trustees' office, corporation secretary, etc.)
- chief executive officer (president, chancellor, associated expenses)
- chief academic officer (senior academic officer on each campus)
- chief business officer (executive vice-president, vice-presidents for finance, business administration, plant and services, etc.)
- planning and budgeting (budget offices, planning, inst. research)
- legal counsel (internal and external)
- equal employment opportunity (affirmative action, etc.)

Omitted non-comparable items included: academic senates; investment management expenses, some of which showed up in operating budgets but most of which are charged to investment incomes; chaplaincy, or equivalent; other activities such as university historian, university professor.

Fiscal and information services included:

- fiscal reporting items such as accounting, cashiers, grant and contract administration, internal and external auditing;
- administrative data processing, mgmt. information, and systems development. Since some institutions bill data processing to users, not all costs may have been captured in this category.

Logistical services included:

- employee personnel and records;
- purchasing;
- environmental health and safety;
- security.

Other items varied so widely as to be non-comparable.

Community relations and development included:

- Vice-Presidents for Development, Public Affairs, and similar activities, plus other development staff and costs;
- Public Information, Public Relations, and Publications except for catalogue and bulletin costs;
- Alumni Relations;
- Fund-raising, capital fund-raising, "relations with schools" and government relations/resources.

PUBLICATION USAGE INDEX (PUI): A QUANTITATIVE METHOD OF EVALUATING THE PUBLICATIONS OF SCIENCE FACULTY

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With the prevailing academic problems related to finances and enrollment, quality will of necessity increase in importance on college campuses if an institution is to survive. Quality of faculty research activity must be included in future hiring, promotion and tenure decisions.

One measure of research activity may be found in a faculty member's publications. According to the results of a survey by Startup and Gruneberg (1976), "...extrinsic rewards in the form of prestige and promotion flow not so much from research activity as from its products -- particularly published materials." They go on to report that 55% of the respondents felt pressure to do research and to publish for promotion. This pressure was felt by 90.6% of Senior Lecturers and 93.3% of Lecturers.

While it is easy to count the publications and determine numbers, a determination of the quality of the publications is more difficult. This difficulty may be behind Batista's observation in his review of the literature (1976), that the predominant criterion in college teaching is research and publications, which are not evaluated but only counted.

The purpose of this study was to determine statistically if publications were, in fact, being used in promotions in science departments of two different institutions; to determine statistically if publications were counted or evaluated for promotion; to propose a method of quantifying scientific publications.

Dissimilar universities were selected for sampling. School A is a large, state-supported, urban university with a student population of approximately 46,000. Doctoral degrees are awarded in the sciences. The University consists of six campuses and thirteen colleges. The oldest college of the University offering a broad curricula in the arts and sciences was sampled. School B is an independent, urban and suburban university with four main branches on three campuses serving approximately 14,000 graduate and undergraduate students. School B does not award doctoral degrees. It is in a state other than that of School A.

Three measures of faculty productivity were researched. They were the total number of publications, publication evaluations, and citation counts. These measures were obtained for the five years preceding faculty promotions in the science departments of the two different institutions. The time range of the study encompassed 14 years from 1964-1978.

The faculty sample consisted of 157 promotions to the ranks of assistant, associate or professor in the past ten years and included both males and and females. Promotions were determined from old catalogues and school newsletters, and were confirmed by the individuals in the sample or by corroborating information in other public files.

PUBLICATIONS

Publications provided the data base for the publication count, publication evaluation and citation count. This study uses the publication count to determine if it correlates with publication evaluations and citation counts. An evaluation of the publication was made according to a weighted scale in the manner of Voeks (1962), and Siefried and White (1973).

However, evaluation was based primarily on the "impact ratio" of the journal, as listed in the "Journal Citation Reports" volume of Science Citation Index. The impact rating is "a measure of the frequency with which the 'average cited article' in a journal has been cited in a particular year." (Journal Citation Reports, 1974). Those journals with an impact rating of one or greater were weighted with three points. There are approximately 750 journals with an impact rating greater than one. Those journals with an impact rating less than one but listed in SCI were weighted two points. There are approximately 1,700 journals with an impact ratio less than one. Those journals which were not one of the approximately 2,500 journals listed by SCI were given a one point weighting. The weighting scale is as follows:

Annual Review Volumes, Symposia ..... 5 points
(5/n if n authors)

Monographs (Includes all published books except textbooks and edited volumes) ..... 4 points
(4/n if n authors)

Articles in journals having an impact rating of one or greater ..... 3 points
(3/n if n authors)

Articles in journals having an impact rating less than one, speciality and regional journals, contributions to encyclopedia, proceedings ..... 2 points
(2/n if n authors)

All other publications*..... 1 point
(1/n if n authors)

* textbooks, edited books, signed research reports, chapters in books, discussion papers, book reviews, abstracts, bibliographies, guide books, published memos and bulletins and government documents, letters, manuals, audio-visual authors. Not considered -- ' to be published,' ERIC articles, ghost writing.

Citation Count -- The Citation Index volumes of Science Citation Index provide an author listing followed by a list of the published articles and years in which he/she has been acknowledged by a citation. Citations were counted for the five years prior to promotion.

The study of publications will be commented upon as applied to the total sample and at specific schools. The publication count in the science departments in the schools studied was the single most important promotional category of several categories studied. The results of an analysis of variance for the total sample are seen in Table 1.

The data, presented below, are in agreement with Aleamoni and Yimer (1973), who report the academic rank of an instructor seems to be more highly related to publications than to other criteria.

Publications were examined in relation to the citation counts and the publication evaluations, as well as a simple publication count. Significant positive correlations were obtained, as seen in Table 2.

TABLE 1

ANALYSIS OF VARIANCE FOR DATA
CATEGORIES BETWEEN RANKS

Data Category	F (Probability)	Sample Number
Citation Count	F = 2.76 (0.07)	156
Publication Count	F = 5.82 (0.004)*	156
Publication Evaluation	F = 6.13 (0.003)*	156
Grants	F = 1.16 (0.32)	156
Student Evaluation	F = 0 (1.0)	103

* $p \leq 0.05$

TABLE 2

PUBLICATION CORRELATIONS FOR TOTAL SAMPLE

	Publication Count	Citation Count	Publication Evaluation
Publication Count	X	0.51*	0.89*
Citation Count		X	0.58*
Publication Evaluation			X

*$p \leq 0.05$

Publication Count Versus Publication Evaluation

The strong correlation between the publication count and evaluation (0.89) would be expected. A prolific writer stands a better chance of having his work appear in journals than does a sporadic writer. A person who writes very little would be expected to have a low publication evaluation. While diametrically opposed, both groups would provide the high correlation between publication counts and evaluations that was obtained in the present study. The strength of the present correlation corroborates the finds of Cole and Cole (1973) in physics.

Publication Count Versus Citation Count

The moderate correlation between the citation and publication count (0.51) is interesting. The correlation implies that the sample includes both many writers who have high publication counts and citation counts and writers with low publication and low citation counts. In addition, there must be writers who have high publication counts but low citation counts, and vice-versa. Twenty-six percent of the total sample, in fact, had no citations at all.

Table 3 lists examples of publication and citation counts to illustrate this point.

TABLE 3

PUBLICATION AND CITATION COUNTS
FOR SELECTED SUBJECTS

Subject	Publication Count (5 years)	Citation Count (5 years)
1	8	246
2	7	133
3	40	110
4	17	10
5	10	0
6	9	5
7	39	12

Subject 1 has a low publication count with high citation counts while subject 5 has a high publication count with no citations. The practice of counting publications is apparently widespread in the consideration of university promotions. However, the preceding examples demonstrate that counting publications does not guarantee that quality work is being rewarded.

Citation Count Versus Publication Evaluation

A moderate correlation between the citation count and the publication evaluation was found (0.58). The publication evaluations for each article ranged from alow of 1 to a high of 5 points. A perfect correlation was not found since a high evaluation could have been obtained by subjects with many articles rated at one point with few citations, as well as by subjects with a few articles rated higher. Table 4 illustrates this point.

Subject 3 has many lesser weighted articles than subject 4, but both have the same total evaluation. Publication evaluations, as demonstrated, have inherent sources of error and cannot be relied upon to demonstrate quality of work.

"Publication Usage Index"

Perhaps one measure of the impression an instructor makes upon his discipline could be obtained by dividing the number of citations by the publication count. This "PUI" would provide the average number of times an instructor's articles were cited by other authors. Table 5 gives examples of how this would work.

TABLE 4

COMPARISON OF PUBLICATION RATING SUBSCORES FOR SELECTED SUBJECTS

Subject	One Point	Two Points	Three Points	Total Evaluation
1	6	3	2	18
2	0	0	6	18
3	12	1	1	14
4	0	4	2	14
5	18	8	0	34
6	1	0	12	37

TABLE 5

COMPARISON OF PUI FACTORS FOR SELECTED SUBJECTS

Subject	Publication Count	Citation Count	PUI Count
1	12	0	0
2	11	13	1.18
3	17	55	3.24
4	17	10	0.59
5	19	240	12.63

A person, such as Subject 1, with publications but no citations would have a zero PUI factor. A person, such as Subject 4, with many publications but few citations would have a PUI factor less than one. A person, Subject 2, who averages one citation per article would have a PUI factor of approximately one. A person with a few publications and many citations, such as Subjects 3 or 5, would have a PUI factor much greater than one.

Hagstrom (1971) had used a similar measure in his study, "The Prestige of University Departments." However, he used mean citations in 1966 and divided by mean articles published from 1961-1966. Since Science Citation Index [illegible] 1961 by indexing only 700 volumes (now 2,800 volumes are indexed), the [illegible] may not have been large enough to provide the sensitivity needed.

PUBLICATION USAGE INDEX

If the PUI factor is examined for both schools, an interesting event is seen (Table 6).

TABLE 6

MEAN PUBLICATION USAGE

Rank	School A	School B
Assistant Professor	1.93	0.73
Associate Professor	6.58	1.38
Professor	6.35	2.13

The progression through ranks at School B reveals a tendency to select for instructors who have more citations per article than those instructors in the lower ranks. How this selection occurs in practice was not revealed by the present study.

The PUI at School A reveals that the mean article written by instructors in the senior ranks is cited 6.5 times. Each article written by senior faculty at School A is cited by approximately six other papers. This gives some indication of the impression the senior faculty at School A is making on its respective disciplines.

The PUI at School B discloses an increased (but not significant) citation rate in senior ranks, with professors' articles being cited by two other articles.

Analysis of variance revealed significant differences in PUI between the schools ($F = 9.68$, $df = 155$, $p = 0.002$), but not between ranks. There was no interaction between schools and ranks. Hagstrom did find that average research articles and citation counts combined accounted for half the variance in rated quality of departmental prestige.

TYPES OF PUBLICATIONS BY DEPARTMENTS

The highest percentage of faculty members published articles in journals listed in Science Citation Index. A smaller percentage published in journals not listed in the Index. Table 7 lists the departments and the percentage of faculty publishing in journals with different values as determined in the weighting scale used in the present study.

The departments of Botany, Geology, and Zoology at School A have higher percentages of publication in journals with lower weightings. These journals should not be thought of as "lesser" journals. Rather, what is being seen is a reflection of the current activity in the discipline. If a discipline is in a less active stage, the journal articles will be cited less frequently and will be accorded lesser weights.

The discrepancy between departments underscores the need to establish promotional criteria within subdisciplines of science, and illustrates the dangers of establishing generalized promotional criteria.

To summarize, the data indicate that while publications are a factor in faculty promotions, only quantity is measured. There appear to be no attempts to quantify publications in any way. The Publication Usage Index is suggested as one way in which publications could be quantified if certain caveats were included. One danger would lie in trying to quantify that exceptional work that does not find immediate acceptance in the field. Another would lie in trying to quantify publications between departments. However, when hard administrative decisions must be made, perhaps the Publication Usage Index could aid in judicious and thoughtful evaluations.

TABLE 7

PERCENTAGE OF FACULTY PUBLISHING IN VARIOUSLY WEIGHTED JOURNALS BY DEPARTMENT

Department	Journals Valued 1 Point	Journals Valued 2 Points	Journals Valued 3 Points	Journals Valued 4 Points	Journals Valued 5 Points	Sample Number
School A						
Microbiology	43	57	86		14	7
Botany	72	43	100			7
Chemistry	43	28	87		4	23
Geology	78	71	89			7
Physics	24	35	97		10	6
Physiology	67	50	100			6
Zoology	75	33	83			12
School B						
Biology	17	36	54			28
Chemistry	21	32	53			19
Physics	35	41	41			17

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THE ROLE OF INSTITUTIONAL RESEARCHERS IN LABOR CONTRACT ADMINISTRATIONS

Since the theme of this conference is "Doing Institutional Research: A Focus on Professional Development", I thought it may be appropriate to speak about an application of institutional research which may be new to many of you. My topic is the role of institutional research offices in labor contract administration.

The organization of various employee groups at higher education institutions into bargaining agencies has been a growing movement over the past 10 to 15 years. Today, in many institutions most employees, including maintenance, security, clerical, and professional staff, as well as faculty members are represented by bargaining agents recognized by the NLRB. In state systems or multiple campus institutions, the legal interaction between the administration and the unions takes place at the central administration level rather than separately at each campus. In single campus institutions, this interation takes place right on campus and is often far more visible to all employees, students and parents. While the involvement of I.R. offices in labor contract related activity may be more frequent in single campus institutions, even in multi-campus institutions, much of the data needed to fuel the process must be supplied by the I.R. offices located at the individual campuses. Why, you may ask, involve Institutional Research offices at all?

Dealing with labor organizations effectively requires, among other things, accurate, up-to-date and quickly retrievable statistical and

financial information about the bargaining unit. During contract negotiations, decisions are made and remade in a relatively short and stressful time period. These decisions often involve policies and major financial commitments for several years into the future. During the life of the contract, exact administration of contract provisions, timely reporting and monitoring of implemented changes and the ability to access, analyze and present historical data for grievance cases are all essential. Errors at any of these stages can be both financially and politically costly. The combination of skills and data required to respond to these needs, typically exists in the institutional research office of the institution. Just exactly how can I.R. offices help in this process?

TYPES OF SUPPORT NEEDED IN LABOR CONTRACT ADMINISTRATION

During Contract Negotiations

Contract negotiations typically involve the two parties presenting their respective proposals, which become the starting point for the negotiations. During the course of the bargaining, different parts of a contract are hammered out one at a time. Usually each side has a handful of key issues which they consider important enough to fight for and other issues which are "straw men" proposed only to be "yielded" during the bargaining. The key to the administration's stance on many of these issues, primarily concerning wages (or salaries) and fringe benefits, is cost. Therefore, at each stage of the negotiations, from original proposals to final contract, the cost of each alternative must be quickly and accurately calculated. This is where the institutional research office comes in. With access to the necessary data and data processing

ability, that office can model benefit costs in a way that will allow the cost of proposed wage increases or benefit changes to be calculated reliably and quickly. Our experience has been that this type of model needs to use individual data about bargaining unit members, rather than aggregate data, and combine these with changeable contract parameters. Using individual records rather than aggregate data is not only likely to yield more accurate results but also allows far more flexibility in the analysis and costing of alternative contract scenarios.

Development of Comparative Statistics.

In the course of normal labor relations, one party or both will inevitably resort to presenting comparative data to support their own position or to discredit the opposing position. This is another area where administrators will turn to the institutional research office for help. It is the responsibility of good institutional researchers to have at their fingertips the most current statistics about their own institution as well as about other comparable institutions. In addition, current and historical regional and national statistics must be accessible ranging from the Consumer Price Index to various labor and census statistics. Even more important than having the available data is the need to have institutional researchers who can critically evaluate the relevance of the data and correctly interpret them. This is one point where the skill and the intellectual integrity of a good researcher can often be put to the test.

During the Administration of Contract.

The final contracts negotiated, especially those involving faculty, can often call for complex allocation schemes aimed at achieving very

specific results affecting different groups in the bargaining unit. A typical example for faculty may involve different benefits as a function of longevity, academic rank, and academic discipline. The institution's data processing facility may not be set up to handle such unusual calculations or be able to incorporate them in their regular reports on short notice. This is another area where an institutional research office can be called upon to play a key part. The calculation and implementation of complex formulas for salary increases requires analytical skills, a complete and accurate data base, and the data processing ability to combine the two. I will return to the issue of the data base, since it has proven in our experience to be one of the more difficult aspects of labor contract related work.

Analysis and Reporting of the Results of the Contract.

One of the inevitable, and probably more useful, results of having negotiated labor contracts for any segment of employees is the increased demand from both union and administration for descriptive data about the status of the bargaining unit. The contract typically provides for periodic (e.g. monthly) reporting of current membership, their wages or salaries (possibly for current as well as several historical periods), and numerous demographic descriptors which identify employees as belonging to one or another subgroup of the bargaining unit. Both the administration and the union will be interested in how closely and exactly the provisions of the contract were carried out and at what cost. In addition both groups will attempt to identify individual and/or group inequities which may occur. Again the keys to providing this information are analytical capability, good data, and the necessary data processing capability.

In the course of providing this type of information, an interesting

choice may arise. Unions will, on occassion, burden the employer with blanket requests for large amounts of information. They are often entitled to have access to this type of information. The choice which arises is whether to use institutional resources to perform a large number of analyses requested or to provide raw data instead. While the initial impulse may be "give them the data and let them do the work", it is usually better to provide the results of the requested analysis instead. The reason is that when raw data are provided, arguments will inevitably arise about the correctness of the analysis performed by the union or of the conclusions drawn from the data. The institution will want its own analysis done to check the analysis made by the union. Since the work will have to be done anyway it is easier to provide the results to start with, so everyone works with the same information, avoiding when possible the debate about the analysis. The analysis needed is ideally performed by institutional researchers.

Providing Data for Grievance Settlements.

One additional aspect of an organized labor environment which may require the resources of an institutional research office is the processing of grievances. Grievances, by their nature, involve claims about past events, acts, or procedures. As such, they require complete and accurate historical data and their meaningful interpretation. This type of data are not normally kept on-line by data processing centers but must be retrieved and compiled from historical records usually spanning several years. Depending on the method by which such data are stored and the data processing capability of the institutional research office, this retrieval task may well fall upon institutional researchers.

THE COSTS AND BENEFITS OF INVOLVEMENT IN LABOR CONTRACT ADMINISTRATION

The decision concerning the role that the institutional research office plays in labor contract administration is influenced not only by the technical ability of such an office to provide support, but also by considerations of the costs and benefits involved. The costs are not negligible. A campus which may have several bargaining units representing different employee groups, all negotiating their own contracts on independent schedules is likely to be involved in negotiations almost on a constant basis. New contracts with new provisions begin annually. In such a situation, the support needed could well require the full-time commitment of an analyst, as well as occasional research and programming support. In addition to the staff time, this involvement will require constant and extensive use of data processing facilities.

In exchange for these commitments, the institution receives several benefits. The first of these is better information prepared professionally and consistently by institutional researchers who become intimately knowledgeable about data relevant to the various bargaining units. A second benefit is that the variety of analyses and different ways of examining trends in staffing and benefits will provide insights into the institution's health which the administration may not have gotten without the close scruting of data required in this process. Questions are often raised about the consistency, cost and value of different personnel policies and procedures and the analyses will often reveal areas where changes or improvements can be made to the benefit of the institution.

Should institutional researchers get involved in labor contract related work, several difficulties will be confronting them. As we deal

with statistics about large populations, we are used to working with imperfect or incomplete data. In fact we often sandwich our reports between caveats and disclaimers. When dealing with labor unions, the usual tolerance for incomplete or inaccurate data is no longer acceptable. When we deal with the administration of a contract or reporting data about the bargaining unit to the union, each and every record must be complete, accurate, and current. Inaccuracies can result in costly grievance proceedings and awards against the institution. Obtaining accurate data to work with can often become the most difficult part of our task.

Another difficulty possibly confronting those involved in labor contract work is the result of the inherently adversary relationship which exists between labor unions and management. I am referring to the choice involved in the selection and reporting of data. Care must be taken that data developed or evaluated by institutional researchers in support of arguments not be distortions or misrepresentations of the truth.

In closing I would have a few words of advice to those institutional researchers who may get involved in labor contract related work.

- Avoid being responsible for data maintenance. This is a never-ending task which belongs not in the institutional research office but should rest with other academic or administrative offices such as the personnel, payroll, dean's or academic vice president's office.

- Be on the alert for comparative statistics. Establish and maintain contact with other institutions, keep clippings of data published in the "Chronicle of Higher Education" and by many governmental and non-governmental agencies.

- Perform analyses for both management and union. By providing consistently complete and well analyzed data, you can build a reputation for your office and yourself as sources of reliable information and retain the respect of all parties. You will also avoid being embroiled in debates about technical details which can often cloud more basic arguments of substance.

- Be able to stand behind your work with pride. Do not compromise your objectivity.

For those institutional researchers who are called upon to support labor contract administration, this work will be both challenging and at times frustrating. In the end, however, you will find that the area is full of opportunities for doing creative original research and for gaining new insights into the health and welfare of your institution.

A MODEL OF UNIVERSITY TENURE DECISION-MAKING: SOME ADDITIONAL RESULTS

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This paper should be viewed as part of an ongoing project by the two authors to use econometric modeling techniques to evaluate the impact of selected factors on the process of promotion and tenure decision-making within the context of a large university. To date only the tenure decision has been modeled, with this paper extending the previous work of Fuller and Goodwin (1981) through the addition of variables measuring regional labor market pressure. Further refinement is anticipated to include addition of several more academic years of decision data as well as similar modeling of the promotion process.

University faculties have traditionally been highly concerned with the methods used in granting tenure, and naturally so, since the goal of this process is to validate faculty accomplishments and to award career security. Historically, universities have used various criteria in this evaluation process; for example, excellence in teaching, publication, and research, as well as service both to the academic community and to the profession. Such factors are of course considered in the context of labor market conditions within each academic discipline, the level of tenure in each department and college within the university, and the anticipated enrollment growth or decline.

In the 1980's and 1990's when enrollments are expected to decline overall but not necessarily in an even fashion across disciplines, it may become more and more crucial to forecast requests for tenure by academic discipline. This becomes all the more critical if an institution seeks to impose broad guidelines for levels of tenure, or even goes so far as to specify goals and timetables for tenure percentages. It is within this context then that a model predicting more than the numbers that will be applying for tenure over the coming years would be helpful; more specifically, what is the likelihood that those who apply for tenure will pass through the qualification procedure and achieve that status?

An examination of the literature has yet to unearth a formal econometric model of the tenure and promotion decision-making process. Much of the literature (see the ERIC data base) focuses on the descriptions of the processes and their application, with and without collective bargaining, to planning and institutional resource management. The University of Southern California Faculty Planning Model makes available to its users the probable impacts of changes in university policies along several of these dimensions. However, it has little to say concerning whether stated policies actually influence the individual decisions made on promotion and tenure (see Linnell, 1976, and Linnell and Gray, 1977).

Presented herein are some preliminary results of econometric analysis of the actual tenure decision-making process at a large eastern university based on information on application for and the subsequent granting or denying of tenure over a recent three-year period. This process occurred within the context of a formal contract between the University administration and a faculty union. Both the tenure process and the criteria used were unchanged over the time period in question.

Maximum likelihood techniques are used to estimate the parameters of a model which accounts for the probable correlation between "unmeasured factors" which affect both "faculty tenure applications" and the "university tenure decision-making process." This model has been used to assist in predicting success in achieving a mandated trustee goal of lowering tenure by 10% over 20 years.

Preliminary results point to the following:

(1) In spite of the fact that the number of publications since date of hire is generally thought to be a predominant factor in a university's tenure criteria, the variable which measures a faculty member's publication history <u>since</u> coming to this institution is not a dominant factor. A variable potentially measuring "level of professional achievement prior to joining this institution's faculty," however, does appear to have a relatively stronger impact on the university's decision.

(2) As one would expect, the university appears to attach more importance to years at this institution than the individual faculty member does when deciding whether or not to apply for tenure.

(3) As expected, the two variables measuring labor market pressure point

quite strongly toward individuals in low pressure areas being more likely to apply for tenure. However, contrary to expectations, these same faculty appear to have been more likely to have been granted tenure; some possible reasons for this phenomenon are discussed in the text.

(4) While the possession of a terminal degree is, by far, the most significant determinant of whether or not an individual will apply for tenure, it is somewhat less important in the university's decision to grant or deny it.

(5) The university's commitment to Affirmative Action appears to be somewhat substantiated by the positive coefficient on a variable measuring minority status in the tenure function. On the other hand, for whatever reasons, females appear to have a tendency not to even apply for tenure; there are several possible explanations for this phenomenon.

(6) A variety of other variables measuring an individual's status within the university appear to affect neither the application for nor the university's decision to grant tenure.

Finally, a comparison of the simple probit estimates of each function with those obtained from maximum likelihood analysis of the entire process (taking into account the probable correlations between unmeasured influences on each decision) indicates that proper specification of the decision-making process is of vital importance in determining how the variables influence each set of decisions.

A description of the actual tenure process is specified in summary form in Fuller and Goodwin (1981). The advantage and usefulness of this type of model is severalfold:

(1) the data is easily collected as part of an annual faculty activity or progress report, summarized by the appropriate reporting administrator (dean, division head) for the annual report of the vice president;

(2) annual predictions can be made of those who are most likely to make it through the tenure screening process, ceterius paribus;

(3) the marginal levels of accomplishment which are necessary to bring a junior faculty member up to tenure caliber can be roughly identified; this becomes particularly interesting when applied to the counseling of women and minority junior faculty as they undertake to qualify themselves for tenure.

I. A Model of Tenure

The granting of tenure can easily be classified into a two-stage process (1) an individual faculty member must decide whether or not to apply for

tenure, and then (2) the university must decide whether or not tenure is to be granted. If an individual chooses not to apply for tenure, then, in this model, no further consideration is given to that individual.

Within this two-stage decision-making process, several considerations are important. First, it is unlikely that the model is able to specify all factors influencing both the decision to apply for and the granting of the tenure. At best, variables measuring the more important individual faculty member characteristics, labor market conditions, and existing academic departmental compositions can be collected. It is well-known that, should unmeasured factors influencing the application decision be correlated with the unmeasured influences in the tenure decision, consistent estimation of the parameters in this model cannot be achieved without taking account of this phenomenon. Details of this sample-selection bias have been presented elsewhere (see, for example, Venti & Wise (1982) and Venti (1982), Meyer and Wise (1979), Griliches, Hall, and Hausman (1978), and Hausman and Spence (1977). Clearly, any unobserved personality conflict which is likely to influence the tenure process would also be a factor of some importance in the applications decision. As a result, some correlation is likely to exist between unmeasured influences in each of the two stages of this decision-making process, and some measure of this correlation must therefore be considered as part of the overall model. Presented in Fuller and Goodwin (1981) is a model which describes two separate decisions being made by different decision-makers with these processes connected by the likely correlation between the unmeasured characteristics in each equation.

II, Estimation and Results

Fuller and Goodwin (1981) describes the tenure model used in analyzing those factors which most significantly influence both the faculty member's decision to apply for tenure and the university's decision to grant tenure. In this section, a general description of the data used here is followed by presentation and analysis of parameter estimates.

(a) Summary of Data. Historical data on faculty accomplishments was collected in 1977 as part of a presidentially mandated salary equity study. Subsequent updates in the Spring of 1978 and 1979 have yielded the overall data base which is described in Table 1. In brief this information can be classified as follows: The race of each individual faculty member was classified as either Caucasian, Black, Spanish-American, or Asian-American while

the usual characterization of male/female was used for the sex variable. The highest degree received by each faculty member was described as either B.A., M.A., or Ph.D. Information on the number of years to have elapsed since receipt of that degree was also obtained. A dichotomous variable was used to indicate whether that degree was considered to be the terminal qualification for that particular profession; for example, in industrial technology and in musical performance, an M.A. is considered by this institution to be the terminal degree.

Years of teaching experience for each individual was divided into the number of years at the institution in question and the number of years elsewhere. The rank of each faculty member was classified as instructor, assistant professor, associate professor, or full professor; the number of years that an individual had held that rank was also identified. In addition, the annual salary paid each faculty member each year was included.
The variable measuring a faculty member's publishing productivity since coming to the institution was deemed to be of primary importance. The initial classification scheme which assigned a zero (0) for no publications, a one (1) for between one and three journal publications, a two (2) for four to seven journal articles, and a four (4) for eight or more articles or for one or more books was converted to actual numbers of publications. The percentage of faculty members tenured and the percent in each academic rank were calculated for each academic department and for each college within the university. A dichotomous variable was also used in an effort to capture unmeasured departmental and college characteristics.

Mean salary levels were obtained for most academic disciplines in an effort to measure the labor market pressures and opportunities in each of these areas. It was also possible to specify those colleges within the university where the most external pressure presented problems in obtaining qualified personnel. Since there appeared to be three distinct levels of labor market pressure within the colleges (low, medium, and high), two dichotomous variables were used to identify each individual faculty member's status; thus, separate "low pressure" and "high pressure" variables were created with the "medium pressure" status being the default category.
(b) Dependent Variables. Records of applicants for tenure, the subsequent progress through internal decision "channels", and the final evaluation were available. Precise identification was possible of those who applied for

and those who were either granted or denied tenure, and how far each made it through the five stage university decision process. All of this information was obtained for each of the academic years 1976-77, 1977-78, and 1978-79. If a faculty member was not at the university during any one of the three years in question, his or her data was classified as missing for that year only.

The pooling of data for the three years in question is legitimate only if internal university conditions were essentially unchanged over the entire period. Two facts point toward this being the case. First, the collective bargaining contract delineating both the tenure process and the tenure criteria was in force and unchanged during the entire time period. Second, the president, most of the deans, and most of the membership of the relevant committees were unchanged during this period.

(c) A Tenure-Process Model. The results presented here are preliminary in the sense that certain variables discussed previously have yet to be integrated into the data base. For example, the effects of such factors as departmental characteristics on either the applications decision or the tenure decision are as yet unknown. Fortunately, none of these types of influences were deemed a priori to be of sufficient importance to have their exclusion substantially bias the results presented here.

The results are described in Table 2. Separate probit estimates were obtained for both the applications function and the tenure function (second and fourth columns). In contrasting these to the estimate of the two functions obtained with the joint maximum likelihood procedure (described in Section II) which accounts for, and also estimates, the probable correlation between unmeasured characteristics (p), little difference is found between the two sets of estimates of the applications function. This substantiates the well-known fact that sample-selection bias only yields inconsistent estimates of the parameters of the principle (tenure) equation, not the sample-selection (applications) equation.

A comparison of the two sets of tenure estimates (third and fourth columns) illustrates this further. The estimated correlation between unmeasured characteristics ($p = .82$) is sufficiently large to cause substantial bias in some of the simple probit estimates (e.g., the terminal degree, the labor market, and the number of publications). Thus, had the joint maximum likelihood procedure not been employed here, the results to be discussed next would have been quite different and inappropriate.

With respect to these results (as presented in the first and third columns of Table 2), it is clear that the university tenure process considers the acquisition of the terminal degree to be relatively more important than is perceived by the individual applicant. However, both the individual applicant and the university appear to agree that the possession of a terminal degree is an extremely important factor determining whether tenure will be granted. (The marginal effects of each variable on the probabilities involved are presented in Table 3). This effect is sufficiently strong that the likelihood of being granted tenure without a terminal degree is extremely small.

It is also apparent that, contrary to expectation, the number of publications since coming to this institution is not a very strong factor in either the applications decision or in the granting of tenure. On the other hand, however, both the individual applicant and the university seem to attach the same relative level of importance to each publication. It may be that some combination of the years of prior experience variable and the number of publications variable would be a more appropriate measure of the research "quality" of an individual faculty member. Unfortunately, the years of prior experience variable has yet to be incorporated into the data set for non-applicants.

Another relatively important variable in both functions appears to be the number of years at this institution, with the probability of both applying for and being granted tenure increasing as the years go by. A part of this effect is obviously measuring the requirement that an individual faculty member must either be granted tenure or given a terminal contract during his or her sixth year at this institution. It is also important to note that this variable takes on considerably greater importance in the university's tenure granting process than it does in the individual's application decision. The primary effect being felt here probably applies to those individuals who apply for "early" consideration; the individual generally makes an "early decision" after personal comparison to colleagues within the college or department in question, yet the university must consider the faculty member in the context of the entire pool of applicants and those who have previously received tenure. Thus, the university is likely to be far more selective in granting "early tenure" than the individual applicant would expect.

Some measures of the success of the university's Affirmative Action efforts may be captured in the tenure equation's racial minority variable.

The stated policy of the university has been to concertedly search for and hire highly qualified minority faculty members. The positive coefficient on this variable may reflect the inability ofthe publication and years of experience variables to totally capture all of their qualifications. The negative coefficient on the sex variable in the applications equation is judged at least in part to reflect a redefinition of the terminal degree from M.A. to Ph.D. in one department consisting primarily of female faculty members (Nursing). Should a negative coefficient remain once this particular phenomenon has been controlled for, it could indicate a tendency for females to move elsewhere, for whatever reason, prior to applying for tenure.

With regard to the two variables purporting to measure labor market pressure, the expected result of individuals in low pressure areas being more likely to apply for tenure (possibly because they have few employment alternatives) was obtained. Also, given that the University had recently gone through a significant reorganization process many of these individuals may have perceived this as their last chance to take advantage of a "grandfather" clause in the collective bargaining agreement which allowed individuals to become tenured at the Assistant Professor rank. "Medium" and "high" pressure individuals appear to be little different from one another in the likelihood of application. Of more concern here is the result that faculty members from "low pressure" colleges appear to be far more likely to be granted tenure once they apply (again "medium" and "high" pressure status do not differ significantly from one another). The previously mentioned "grandfather" clause and other possible effects of transition to University status during the early years of this analysis may well explain such a phenomenon. Continued collection of data (now being undertaken) will reveal whether these findings did in fact result from such transitory effects.

Other variables were explored for possible inclusion in this analysis. Indicator variables for the college from which an individual was applying added nothing to the functions. Variables indicating an individual's rank proved to be unuseable in the tenure equation because the sample sizes were much too small (only two associate professors and one instructor applied).

In summary, some continued modeling of the tenure decision process has been described here. It's usefulness is seen in personnel planning and evaluation of tenure decision making processes over time. While the results described above are of considerable interest in their own right, additional refinement of the model would be helpful. First a more careful specification of

variables measuring departmental characteristics needs to be included. The criteria of teaching excellence and service to the university and the community also should be measured and tested in these functions. It would also be helpful to have the same modeling effort applied in the sequence of faculty promotion decisions, from instructor through to full professor. And, in conclusion, the model should be tested through application to an existing set of potential applicants, yielding results indicative of the ability of this model to track individual faculty members as they may or may not apply for and be granted tenure.

TABLE 2

TENURE PROCESS

VARIABLE	APPLICATION DECISION ESTIMATES		TENURE DECISION ESTIMATES	
	Joint Maximum Likelihood	Simple Probit	Joint Maximum Likelihood	Simple Probit
Highest degree is a terminal degree (1 = yes):	.840 (2.83)	.844 (2.95)	1.23 (2.44)	.981 (1.62)
Number of publications since coming to institution:	.050 (1.20)	.049 (1.23)	.040 (.75)	.006 (.114)
Number of years teaching elsewhere:	-----	-----	.082 (.92)	.112 (1.46)
Number of years teaching at this institution	.132 (1.50)	.131 (1.63)	.302 (1.60)	.330 (2.03)
Faculty member's sex (1 = female):	-.270 (1.03)	-.254 (.98)	-----	-----
Faculty member's race (1 = non-white):	-----	-----	.222 (.49)	.278 (.45)
Low Pressure Labor Market	.720 (2.46)	.715 (2.62)	.748 (1.91)	.401 (.912)
High Pressure Labor Market	.169 (.52)	.179 (.58)	-.109 (.33)	-.450 (.90)
Constant	-1.82 (3.89)	-1.82 (3.63)	-3.43 (4.68)	-2.25 (2.29)
ρ	.82 (1.11)	-----	-----	-----
Value of log likelihood function:	-139.7	-105.4	----	-37.7

NOTE: Asymptotic t-statistics are presented in parentheses.

TABLE 1

DESCRIPTIVE STATISTICS

VARIABLES	ALL NON-TENURED FACULTY* Mean	Standard Deviation	Range	TENURE APPLICANTS** Mean	Standard Deviation	Range
Faculty Member's Race (1 = yes):						
White	.863	.344	0-1	.915	.279	0-1
Black	.046	.219	0-1	.017	.129	0-1
Spanish American	.034	.182	0-1	.000	.000	0-1
Asian American	.057	.232	0-1	.068	.251	0-1
Faculty Member's Sex (1 = female):	.354	.478	0-1	.288	.453	0-1
Highest Degree Received (1 = yes):						
Ph.D.	.709	.454	0-1	.814	.390	0-1
M.A.	.291	.454	0-1	.186	.390	0-1
B.A.	.000	.000	0-1	.000	.000	0-1
Number of Years Elapsed Since Highest Degree Received:	3.43	3.50	0-23	3.94	3.81	0-23
Is the Highest Degree A Terminal Degree (1 = yes):	.749	.434	0-1	.864	.342	0-1
Number of Years Teaching at this Institution:	2.93	1.58	1-9	3.03	1.38	1-5
Number of Years Teaching Elsewhere	3.37	2.96	0-12	n.a.	n.a.	n.a.
Faculty Member's Rank (1 = yes):						
Full Professor	0.0	0.0	0-0	0.0	0.0	0-0
Associate	.042	.200	0-1	.039	.192	0-1
Assistant	.826	.379	0-1	.942	.233	0-1
Instructor	.132	.338	0-1	.019	.137	0-1
Number of Years in Present Rank:	2.20	1.16	0-5	2.20	1.12	0-5
Number of Publications Since Coming to this Institution:	2.45	3.57	0-20	3.31	4.39	0-20
Faculty Member's Annual Salary:	$15,369	$2,414	$9,308-24,000	$16,032	$2,280	$11,689-23,000
Faculty Member's College (1 =yes)						
Education	.040	.196	0-1	.119	.323	0-1
Engineering	.114	.318	0-1	.170	.375	0-1
Health	.126	.332	0-1	.102	.302	0-1
Liberal Arts	.251	.434	0-1	.237	.425	0-1
Management	.194	.396	0-1	.119	.323	0-1
Music	.063	.243	0-1	.085	.279	0-1
Science	.211	.408	0-1	.170	.375	0-1
Year of Eligibility (1 = yes):						
1976-77	.323	.468	0-1	.322	.467	0-1
1977-78	.270	.444	0-1	.339	.473	0-1
1978-79	.407	.491	0-1	.339	.473	0-1

* The number of potential tenure applications during this period was 175.
** The number of actual applications was 59, with 31 (or 53%) actually being granted tenure.

TABLE 3

MARGINAL EFFECTS OF TENURE PROCESS VARIABLES

VARIABLES	MAGNITUDE OF CHANGE*	RESULTING CHANGE IN PROBABILITY
APPLICATIONS EQUATION**		
Possession of a Terminal Degree:	-1.0	-.222
Number of Publications:	+3.57	+.068
Number of Years Teaching at this Institution:	+1.58	+.080
Faculty Member's Sex (1 = female):	+1.0	-.088
Low Pressure Labor Market	+1.0	.282
High Pressure Labor Market	+1.0	+.065
TENURE EQUATION***		
Possession of a Terminal Degree:	-1.0	-.173
Number of Publications:	+4.39	+.051
Number of Years Teaching at this Institution:	+1.38	+.132
Number of Years Teaching Elsewhere:	+2.96	+.073
Faculty Member's Race (1 = non-white):	+1.0	+.066
Low Pressure Labor Market	+1.0	+.259
High Pressure Labor Market	+1.0	-.029

*The magnitude of change in each variable was set equal to the standard deviation of that variable for all those included in the sample used to estimate the parameters of each equation, except in the case of dichotomous variables where a change of either -1 or +1 was used where appropriate.

**The predicted probability of application, evaluated at the means of the continuous variable was .317.

***The predicted probability of being granted tenure, evaluated at the means of the continuous variables, was .191.

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The Role of Institutional Research-Initiatory or Responsive?

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INTRODUCTION

There are nearly 2,000 individuals in higher education in this country who are working in institutional research either full-time or as a second or third responsibility with sufficient ties to their institutional research role to be members of either the national or a regional institutional research association. Nearly all institutions of higher education have someone performing the institutional research function although many of these individuals are unknown to their counterparts at other institutions.

Stecklein in 1966 pointed out the dichotomy of thought in the purpose of institutional research---institutional research should be free to study any facet of higher education free from demands to provide reports relevant to immediate problems or, alternatively, institutional research should serve as an extension of the president's or executive vice-president's office in developing reports to help solve current operational problems and to stretch the institutional dollars as far as possible. Stecklein thus introduced into the literature the basic dichotomy of initiatory versus responsive (active versus passive) institutional research.

There is a movement for an initiatory role by institutional researchers with the related problem of how far the initiatory role should

be pursued. The institutional researchers, working with the institution's data may observe various trends which should be brought to the attention of the decision makers of the college but at the same time the institutional researcher should not attempt to make the policy decisions by the selection of data from one viewpoint only or by the nonsubmission of data contrary to the decision appearing most desirable to the institutional researcher. As shown by Ross's 1979 dissertation that surveyed all two-year colleges in the country, institutional researchers tended, at least in this particular category of colleges, to significantly disagree with two-year college presidents in regard to the problems facing such institutions. Institutional research is a staff position and as such should not attempt to make line decisions. No individual can be completely impartial but to the maximum degree possible, a good institutional researcher should supply all the pertinent information available to make an unbiased presentation to those who are charged with the responsibility of making decisions.

This past year I surveyed a limited number of colleges in the Northeastern United States using two separate but related instruments upon the different occasions. The first survey was done solely by mail and involved thirty-one institutions selected from those represented at a recent meeting of the North East Association for Institutional Research. This preliminary survey attempted to discover if there were any obvious characteristics that set initiatory institutional researchers apart from more responsively-oriented ones. For the purpose of both of the surveys, an initiatory institutional research office was arbitrarily defined as one in which ten percent, or more, of the studies produced during a specified time frame originated from within the institutional research office itself, not as a result of external requests for data made to the office

whether such requests were totally external to the college or on-campus but external to the institutional research office. This classification was the result of the perceptions of the respondent to the survey since they alone decided what percentage of their studies originated from within the institutional research office. Some of the characteristics investigated included respondent ones such as sex, age, educational background, association memberships, involvement with institutional research organizations and activities on college governance committees, while others were characteristics of the college such as size of enrollment, sources of funding, level of degrees offered, and similar related items. None of these showed statistically significant relationships to institutions where the institutional research function was classified as initiatory. This preliminary study was used to refine and narrow down areas to investigate for possible significance so that the more detailed study that followed could focus more accurately upon potentially significant factors.

The results of the preliminary survey indicated the need for more subjective information than could be culled from a mailed survey alone. Thus the final questionnaire was much more fully developed into a twenty-eight question instrument encompassing six pages sent to a randomly chosen sample of higher education institutions from New York and New England. After the return of the completed questionnaire, each participating institution was telephoned in order to clarify elements of the questionnaire that were not evident to the respondent and also to allow for clarification of answers that were not clear to the recipient of the completed questionnaire. The followup telephone calls also allowed an opportunity to ask an additional set of questions that involved perceptions relating institutional research at each institution to the rest of the administrative

structure, to the faculty, and to the students.

FINDINGS

Institutional research offices that tended to be initiatory in their work by producing studies and reports, within their time constraints, that were not requested from outside the office of institutional research itself, shared two areas of commonality. First, the greater the number of years of doing institutional research, the stronger the ties to being an initiatory institutional researcher and second, the more the institutional researcher believed that institutional research should be more initiatory, the more initiatory that office tended to be. This was no more than would be expected since the longer one works in a given field, the more initiatory one would be expected to be presuming that the incumbent was interested in the work.

The more detailed second study showed that the major criterion separating private from public institutions was the locus of control for decision making and that all two-year, all four-year, and all universities could be grouped together for analysis regardless of private or public control once this locus was recognized. This second study analyzed the colleges in three different groupings: private two-year, public two-year, private four-year, public four-year, private universities, public universities; all two-year colleges, all four-year colleges, and all universities; and all private and public institutions. The only factor that was statistically significant in all three analyses was the amount of time spent by the respondent doing institutional research work. This finding was reinforced by the statistically significant finding among all six college

types and among the two-year, four-year, and university analyses that the presence of one or more full-time workers in institutional research was related to the effectiveness of the function as a recognizable feature of higher education. This statistical significance was not present in the private/public analysis indicating that the presence or absence of a full-time employee in institutional research was not of value in separating public institutions from private ones.

The amount of institutional research done by the use of a computer was statistically significant when analyzing the six different types of institutions and also when analyzing all two-year, all four-year, and all universities, but was not significant when comparing all private institutions with all public ones. This suggested the relationship of college size and complexity to the presence or absence of institutional research, not to the source of funds. Related to this was the statistical significance of the availability of computers to the person charged with the institutional research responsibility. This was significant only in the analysis of the two-year, four-year, and university types of institutions clearly suggesting that the availability of computers for use by selected administrators is related to the size and complexity of the institution. Also interesting in this analysis was the statistical significance of the use of advanced management tools and techniques to this grouping. When all six categories were analyzed this statistical significance disappeared suggesting again the influence of size and complexity upon the use of such tools and techniques.

A series of vignettes were developed describing the varying types of institutional research characteristics at the six different types of colleges. Such vignettes suggested the great variety to be found among

the practitioners of institutional research but there were also threads of commonality such as the increasing importance of institutional research with increasing size and complexity of institutions. The following table summarizes the statistically significant chi squares found in the second study:

Statistically Significant Chi Squares

Question	2-yr Private 2-yr Public 4-yr Private 4-yr Public Private Univ. Public Univ.	2-yr Colleges 4-yr Colleges Universities	Private Colleges Public Colleges
12	.0017		.0005
13	.0086	.0028	
14		.0099	
15		.0224	
21	.0407	.0082	
24	.0107	.0165	.0486

This study serves only as a prototype to analyze the field of institutional research but it is a beginning point very needed at this time of decreasing membership in institutional research associations reflecting fiscal constraints nationwide. Institutional research has the potential to be of major service to higher education but it requires practitioners who have the ability to see areas where studies should be made and to develop studies from existing data with which they have more familiarity than any other functional segment of higher education.

SECOND SURVEY INSTRUMENT

1. Your name_____

2. Sex: Male_____ Female_____

3. Age: Under 30_____ 30-39_____ 40-49_____ 50-59_____ Over 59_____

4. Degrees beyond baccalaurate:

_____
(Degree) (College) (Major Field)

_____
(Degree) (College) (Major Field)

5. a. Other training or experience you have found most relevant to your work in institutional research:

_____

b. Job related experiences you have found relevant to your work in institutional research:

_____

6. Do you currently hold faculty status? Yes_____ No_____

If yes, what rank?_____ Tenured? Yes_____ No_____

and in what department?_____

7. Your current title as related to your institutional research function?

_____

8. What is the title of the person to whom you report in your institutional research function?

_____

9. To what title does the institutional research function report if different from the answer to question eight?

_____

10. What is the number of years you have been doing institutional research at your present institution?

_____years

In your higher education career?

_____years

11. a. Of which, if any, of the following professional associations are you a member?

AIR_____ NEAIR_____ AERA_____ NEERO_____ AAHE_____

SCUP_____ APA_____ AIDS_____

b. What other professional associations related to institutional research do you belong to?

_____

12. What style of management most closely resembles that found at present on your campus when it comes to decision making in the areas listed below? Please place a check in the appropriate space for each decision.

Local - local control of the decision from origin to implementation.

Local+Off - local development of the decision but requiring off-campus approval before implementation.

Off+Local - decision developed off-campus but with considerable input from the campus.

Off - decision made off-campus and handed down to be implemented on campus.

Col/Bar - decision process controlled by collective bargaining agreements.

Decision	Local	Local +Off	Off+ Local	Off	Col/Bar
Admission requirements					
Degree requirements					
Course requirements					
Course offerings					
Grading practices					
New majors					
Program terminations					
Faculty promotions					
Faculty workloads					
Faculty released time					
Faculty salaries					
Scholarship aid					
Tuition and fees					
Capital construction					
Parking rules					

13. What percentage of your work of answering questionnaires and in doing institutional research studies do you do:

by hand?_____% or by computer?_____%

14. Do you have a computer available at your college on which institutional research work is done?

Yes_____ No_____

a. If yes, what kind of a computer do you have access to?

_____

b. Do you make use of the computer yourself? Yes_____ No_____

c. If yes, in what ways do you use it?

_____

15. Do you use any of the following in your institutional research work?

Linear programming_____ Queueing theory_____ Monte Carlo simulation_____ PERT_____ CAMPUS_____ EDUCOM_____ NCHEMS_____

Please specify any similar tools or concepts that you use:

_____

16. What percentage of the institutional research studies generated by your office receive direct feedback to your office from your superiors in the chain of command?

_____%

17. Have you seen examples of changes in college policies that resulted from your institutional research reports?

Yes_____ No_____

18. During the past two years, was an outside consultant hired to do one or more institutional research studies at your institution other than doing statistical analysis for you?

Yes_____ No_____ Unknown_____

If no, has the use of an outside consultant for doing institutional research studies been considered by your institution in the past two years?

Yes_____ No_____ Unknown_____

19. Do you share the results of your institutional research with fellow institutional researchers at other colleges?

Yes_____ No_____

20. Do you publish institutional research studies in campus publications_____, in non-refereed journals such as NEAIR publishes_____, or in refereed journals such as AERA publishes_____?

None of the above_____

21. In the institutional research staff categories listed below, please indicate the number of full-time(35 hours or more per week)and part-time staff:

Institutional Research Staff Categories	Full-time	Part-time
Professional	_____	_____
Secretarial	_____	_____
Graduate students	_____	_____
Undergraduate students	_____	_____
Other	_____	_____

22. Do you have the general coordinating responsibility for questionnaires and institutional research at your institution?

Yes_____ No_____

If no, please list the titles of other offices that share this responsibility with you:

_____

_____

23. Is the institutional research office supported by an advisory group?

Yes_____ No_____

If yes, please indicate below the number of administrators, faculty, and students that make up the group:

Administrators_____ Faculty_____ Students_____ Others_____

Please specify any others_____

_____

24. What is your estimate of the percentage of time you spent doing institutional research work this past college year(1980-81)?

_____%

25. Is there an established procedure to request reports from your office for other segments of the college to follow?

Yes_____ No_____

If yes, please describe:_____

_____

26. Please estimate the percentage of time during a typical work year that your institutional research work falls into the following categories:

(A) Off-campus - questionnaires and data supplied to agencies external to the college such as HEGIS reports for the federal government, data for accrediting agencies, college profiles for admission yearbooks, requests from professional associations such as the American Council on Education, local community groups or doctoral requests such as this one.

(B) On-campus - studies supplied to other segments of the college but where the request originated outside the institutional research office. This might involve data for grant applications, faculty and student data for management purposes, and similar requests that come from on-campus but external to the institutional research office.

(C) Initiated - studies that originated from within the institutional research office at the suggestion of those working in that office without any outside incentive. Thses may be the result of analysis of data collected for other purposes but which the institutional researcher saw could be reinterpreted for management information purposes or it might just be data collected and analyzed purely at the initiative of the institutional researcher.

(D) Other - other time-consuming activities that fall within the purview of institutional research but not within the preceding three categories. Please list below, in general terms, what these activities consist of:

_____

_____

(A) Off-campus_____% (B) On-campus_____% (C) Initiated_____%

(D) Other_____% Total should equal 100%

27. Have any of your studies, originally initiated by the institutional research office, become routinized as standard reports?

Yes_____ No_____

If yes, please specify any such studies which have been so routinized during the past two years:

_____

_____

28. Assuming that all conditions were favorable, what percentage of time do you believe should be available for the institutional research staff to initiate studies of the college based on the staff's knowledge of the needs of the college?

_____%

As a followup to this questionnaire and to ask certain other questions pertaining to your relationship to other offices on your campus, I will call your office shortly after receipt of this questionnaire. Please list any blocks of time when you will not usually be available for such a call such as regularly scheduled meetings, lunch hours, vacation time or known off-campus engagements in the near future:

_____

_____

_____

_____

Your phone number: _____

Thank you for participating in this study. If you are interested in the results of this study please check below.

I am_____am not____interested in receiving a copy of the summary results of this study.

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ACCESS: The System That Never Had A Chance To Fail

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This is a case study of how a system that has administrative support but lacks political control can run into difficulties for those the system is intended to serve. This particular case involves the development of an informational resource system intended for use by the Admissions Office of a medium sized public higher educational institution. Directors of Admissions in many colleges have increased their dependence upon Institutional Research and Data Processing offices significantly because of greater competition for students and the recognition of the need for more sophisticated enrollment management techniques. Larger universities have demonstrated that strategic market planning depends heavily upon close working relationships between Admissions Office and Institutional Research offices to produce the analysis and information necessary to direct resources for more effective recruitment strategies. Some universities and colleges have even gone as far as incorporating research staff into the Admissions office. However, at many colleges, the important informational resource link between Admissions and Institutional Research is at best underutilized and in some cases almost non-existent.

This paper explores a case study of the development of an informational link between Admissions and Institutional Research which helped initiate and finally "accomplished" this particular project. The goal was to design and implement a new computerized prospective student tracking system, but a vast array of political, organizational and operational factors at various times have helped and hindered the development of the system.

SYSTEMS DEVELOPMENTAL HISTORY

The very beginning of the idea for such a system stemmed from a request from the Admissions office to the Institutional Research office to "fill in numbers" on a survey of the Scholastic Apptitude Testing Company. As this was deemed to be the "function" of Institutional Research, to supply "numbers", nothing unusual would have been noted from such a request. However, a point of frustration had been reached by the institution at the beginning of the

1980's due to the decline of enrollments and it had resulted in an administrative reorganization at this college. The reorganization included the creation of specialized research offices in other major divisions of the College (i.e. Student Affairs and Academic administration) in order to provide greater assistance to the Institutional Research Office. In the case of the Admissions office at Brockport, this reorganization allowed a new Institutional Research link through the newly created Office of Research and Evaluation for Student Affairs.

The Director of the Institutional Research office, which is in the Administrative Services division, contacted the new Student Affairs Office of Research to discuss the request. It was during these discussions that the need for a student prospect file became evident and would be possible with current available resources. With further research into the request made by the Admissions office, it was "discovered" that the information on prospective students who have taken or will take the standardized national tests were supplied monthly on tapes and cards for disk storage. Receipt of this information triggered little, if any, response from our Admissions office. From this initial inquiry into lack of responsiveness to our prospective students the idea of building a Prospective Student File, which would then be combined with a computer generated and coded mailing system for appropriate informational pieces to be sent to these students, was developed.

During this same period of Mid-1980 the reorganization of the College included the search for a new director of the Admissions office. The idea for this new student prospect system, therefore, had to be presented without the endorsement or direction of the office for which it was intended. The directors of Institutional Research and Research for Student Affairs approached the Vice President for Student Affairs, the office responsible for the college's admission process. When presented with the idea to develop the system, the Vice President's response was immediate and positive. With his approval and support, work began immediately to proceed with the development of this Prospective Student File.

The first draft presentation of the computerized tracking system for Admissions was made by the Office of Research and Evaluation for Student Affairs in early October of 1980. The presentation was made to the College's executive management and was positively received and approved by the President and his staff. The detailed "walk-through" presentation outlined the benefits of the new system to the College, as well as forseeable obstacles to its

development, but received no apparent opposition from any area. In fact, shortly thereafter, the project was given "Top Priority" for development and implementation so that the impact would be evident by Fall of 1981. This accelerated acceptance was due to the concern of the entire organization over the recent history of declining enrollments and the belief that a system such as the one proposed could help in stabilizing or perhaps increasing student yields.

As work on the development of the system proceeded, the two research offices working together incorporated the assistance of the Office of Administrative Data Processing to develop a program on the Burroughs B-6800, only recently installed in the summer of 1980. As well as Administrative Data Processing, the office of the University Systems Analyst was brought in to oversee the impact of the development of this admissions system and insure integration with the Colleges existing file structures. It was anticipated that the idea for Admissions could grow to a College-wide Data Base communications network for appropriate offices within the college (e.g. Registrar and Records, Financial Aids, etc.).

Although efforts were made to provide leadership in the Admissions area during this period of reorganization the search for a new director of Admissions was begun but not concluded until November of 1980. By December the new director assumed her responsibilities. In discussion with the new director it was agreed that the development of the system should continue subject to her approval on modifications and new additions to the Admissions process.

It was "assumed" in the beginning of 1981 that the admissions area would be responsible for implementation once the specialized research offices completed the initial stages of systems design. No formal appointment was made, however, by the President. In the Spring of 1981 two additional changes in the organization occurred which affected the implementation phase of the project. The first occurence was the temporary change in reporting within the organization for the Admissions office. This change made it necessary for the Admissions director to reorient the new leadership to the importance of the project and its position among a new set of priorities that this temporary leadership was faced with. The second factor was that during the period the President of the College chose to resign and the search for a new Chief Executive Officer for the College proceeded.

With these events chronicled let us now proceed to a brief description of the actual system.

ACCESS: PROSPECTIVE STUDENT FILE

The student tracking system, known as ACCESS (Admissions Communications Components for Enrollment Student Search), had four basic goals. These were to:

1. Segment student populations, both prospective and applicant students, geographically so that Admissions would have a better idea of areas in which it was doing well in attracting new students, and areas that would need more attention in the future.
2. Provide information to the prospective and applicant student in a timely and sequential manner. This would result in the coordination of student contacts and would increase efficiency by eliminating duplication of information.
3. Analyze and evaluate recruitment mechanisms and strategies and suggest improvements for the future.
4. Develop the new system within the existing limits of current resources of the Admissions office.

The main purpose of the ACCESS system has continued to be the provision of a systematic delivery of necessary materials to both prospective (no application on file) and applicant (with application on file) populations of students. As indicated earlier, during 1981 until the present the Offices of Administrative Data Processing, Institutional Research, University Systems Analyst, and Research and Evaluation for Student Affairs along with Admissions has worked on the necessary details of such a file (e.g. format, codes, materials, schedules) and its final implementation for the Fall of 1982 (originally Fall 1981).

The concepts of a coordinated data-base communication system between relevant student service offices that would assist the student applicant has not, as yet been fully addressed. However, the objectives for the Admissions office have been clearly defined. They are:

1. An on-line computer system for prospective and applicant students to Brockport College.
2. The use of the ACCESS file to provide systematic records and continuous contact with both the prospects and the applicants.

3. Analysis of Brockport's market share and development of potential markets.
4. Evaluations of Admissions procedures to increase efficiency and effectiveness of these processes.
5. To provide timely and clear profiles of incoming classes that are the outcome of Admissions efforts for recruitment.

THE PROCESS

The Office of Admissions has prepared an "input card" to be used when contact is made with prospective students by counselors, staff and faculty. This card will provide enough information to create a record on the ACCESS File, which will be created by the Admissions office using the on-line system. The number of records in this file will be controlled by the Director of Admissions in order to predict the size of applicant pools and finally matriculant students to meet enrollment quotas. By creating a record from various sources who will return the input card to the Admissions office, a process will be triggered which will start a series of materials to be mailed to the prospective students. These materials will attempt to convince the student to submit an application. This file consists of prospects in the categories of freshmen, transfers, and high school seniors.

Before sending each mailing, a check of the prospect's file will be made to see if an application has been received. If an application has been received, then the materials sent to the student prospect will cease. A different series of materials will begin which are necessary for applicants. If the student is offered admission to the College, then this prescribed series of mailings will continue until the student arrives on campus to begin his/her studies or does not accept the offer. This part of the file consists of applicants in the categories of freshmen and transfers.

PROPOSED OUTCOMES

From the information supplied by the ACCESS system a number of uses for the Admissions office have been planned in its development.

A. By generating a list of high school seniors from the file and matching them with applications received by the College, a list of "match-seniors" (with applications on file) and "no-match seniors" (no applications on file) can be generated. At this point, the no-match senior can be crossed with the SAT tapes and ACT cards to

determine whether or not Brockport has received their scores. At that time a letter from the Admissions office could be sent to the no-match student stating that Brockport has received their SAT or ACT scores and is awaiting their application.

B. A list of high school juniors that have been contacted will be generated so that earlier and continuous communication with the student and his/her family can be made. Information from the Admissions office will be sent to the student's parents, since, more often than not, the parents have a great deal of influence in the decision process of choice of college. A letter from the Financial Aids office could be sent offering assistance -- giving answers to where applications can be obtained, and any deadlines to be met.

C. A list of high school applicants will be generated and sent to the appropriate officials at the high schools they are attending. In this manner, the Admissions office can communicate with guidance counselors as to who is applying from their school and indicate whether the quality is sufficient or not. The same sort of process can be done for the transfer population from two-year colleges.

D. This file will be used to evaluate Admissions travel. By crossing the applications on the ACCESS file with high school or two-year college codes to get a better idea of where visitations are effective or where they should be reduced. Geographic distribution of matriculated students will help in planning more effective admissions strategies, as well.

E. Additional uses of the file will provide the basic information to help market the college. For example, it will give location and educational history on prospective applicants and allow better planning for these incoming students. It should give offices such as those involved in transcript evaluation and advisement a better indicator of total numbers of students they will be processing in advance of completed applications so they can be prepared. It will also be possible to examine whether or not certain segments of the applicant pool are being reached (e.g., non-traditional, etc.).

The preceeding are just some examples of the scheduled uses of the system. This system, however, has not reached the stage of full implementation, although originally scheduled for Fall of 1981. At present, it is estimated

that implementation will occur by Fall of 1983. Why? The authors will now attempt to analyze how a system, wanted, approved and supported by a college administration can be hindered in its development by the same organization.

PROBLEMS THAT HINDER

The reader may ask, "how can this system with solid organizational support run into problems in its implementation?" Well, there have been many reasons for delay in implementation of the system and most have been organizational rather than technical in nature. The politics of higher education is always a variable in implementation that should be taken into consideration. Certainly, the example of Brockport is one which clearly has shown that organizational and political reorganization has played a role in slowing the process of implementation, even in its climate of acceptance to initiation of this particular system.

As indicated in the brief history of development of this system, it was indicated that the initiation of the project occurred at a time when the leadership within the Admissions office was in transition. The previous Director of Admissions had been moved to a different position within the college's organization during this period and no interim director was chosen to replace him during the search period. From June 1980 until December 1980, the Admissions office was "leaderless". Therefore, the office for which the system of ACCESS was being designed had little, if any direct input. Such a lack of user input can and has led to somewhat of a "benign neglect" attitude, since the staff knew little of the operational techniques of the system. For the system designers this meant that they had to guess what the new director might want from the system and this also led to a "fear" that a new director might not even want to use the system once completed. This, of course, gave the designers a feeling of isolation which is always detremental to the completion of such a project's development. After this six-month period, a new Director of Admissions was chosen; and after an "adjustment" period of approximately three months the director finally had a chance (due to the fact she was hired in the middle and peak of the admissions cycle) to review what had been initiated. She endorsed the completion of the ACCESS file and inquired if she should direct its completion. No direct answer was given to her, so each office went about finishing its part without direct supervision or coordination.

To exacerbate the situation, the President of the College, although having indicated he was going to retire, decided to reorganize parts of the College, due to political conflict among some of the administrative staff. The Admissions office had been moved physically during this period to a new location on campus; and, then after the new director had been in her job only four months, it was decided to change the reporting structure temporarily to a dean instead of the Vice President to whom she had been reporting. The dean was in a different division of the College as well. Since resources for the project had all been in the Student Affairs division it took another three months to initiate and explain what had been done in this particular project to the new dean. So, an additional three months elapsed before being able to continue the project.

By July of 1981, the new President had been chosen, and he directed the Admissions office to report to the Vice-Presidential level as before. The Director of Admissions had to reorient the entire project back again to its original area of Student Affairs.

The changes affected the project even though it was given the institution's "number-one" priority designation. Even with this designation, however, the continuous shifting of the reporting structure created a situation wherein individuals with no previous knowledge of the system had to be indoctrinated and convinced that resources should continue to be diverted towards the project's development. Often, this created confusion, since not all of the resources could be made available under the new organizational structure. It became particularly confusing for those working on creating data input screens for ACCESS and the Data Processing manager, because no notification of who might be in charge of the project, or which division it was necessary to contact for clearances, or whose budget the cost of computer equipment and supplies should be billed.

Another point of interest is how the "number-one" priority designation came about. Before the spring of 1981, there were a number of requests given to Administrative Services Division's Administrative Data Processing and the University Systems Analyst. With limited staff, the number of person-hours to accomplish the proposed projects in these areas would have taken a decade! The development of priorities became imperative. This issue was brought to the attention of executive management, resulting in a full month to prioritize the list of requests for programming. Due to the obvious problems in declining enrollment, the ACCESS system was again given the institution's top priority for these areas.

Within the Admissions office itself, there have been areas which have lagged behind in development. Manual systems for back-up when the computer is "down" were necessary. How to train staff to use the system has only recently been given some attention. The reason for the delay has not been lack of interest but more to do with the nature of the admissions process, cycles and external factors, such as the changes in reporting structure for Admissions indicated earlier. The authors believe that since the project was developed in isolation, rather than in association with staff of the user office, that it has been difficult for the user to understand and often appreciate certain parts of the system as it was built. Of course, due to the pressing concern of declining enrollment, short-term and more immediate projects (e.g. increased travel by staff) have lessened the available time necessary for implementation. These shorter term strategies have, for the most part, taken precedence since they emanate from the executive management. This continual "crisis management" mode of operation detracts from the time necessary to be spent upon the longer range systems implementation.

Another factor in slowing the implementation of the mailing process was due to the hiring of an outside marketing consultant initiated by the College in Spring of 1982. Even if the system were operational in Spring of 1982, the consultant indicated that new materials would be developed and the Admissions office had to wait until the company had finished producing these new materials. Since these materials have not as yet arrived, the decisions as to when, how and to whom they will be directed have not been made. Existing materials have not been re-ordered to insure against the use of "out-of-date" materials. The entire marketing effort is only now being designed so that even with the delivery system in place, the materials are not as yet available.

Interestingly enough, the marketing consultant indicated his lack of knowledge in writing his recommendations regarding the importance of such a system as ACCESS for timely delivery of marketing materials. Certainly, this omission may set the project back, since it could be seen by the executive management as less of a priority in the overall marketing plan for the institution.

LESSONS LEARNED

One of the major outcomes of this continuing process was that even with all the political and organizational obstacles some truly significant changes were instituted. What has been accomplished has been due to the persistence of a link developed between the Institutional Research office and the Admissions office. An example of utilizing this link occurred when the Admissions office was asked to shorten its turn-around time from receipt of application to mailing of acceptance offer. Staff in Institutional Research made suggestions concerning the current process to the Admissions director, which reduced the time for turn-around. The link can be used effectively once confidence in the fact that institutional researchers can do more than "provide numbers" is established in the eyes of the Admissions professional.

Less positive are those lessons which have weakened these same links. These lessons are:

1. Initiation and implementation are equally important and should never be isolated but rather coordinated within the organization.
2. Good ideas and systems are subject to the hazards of the political environment of the organization and simply cannot be avoided.
3. Project management problems arise quickly. The lack of specific project responsibilities, time lines, progress reports and evaluation of outcomes makes it very easy for great lengths of time to pass with relatively little accomplished.
4. There must be a "conspicious consumer" actively involved throughout the length of the project.

STUDENT CHOICES: WHY ARE ELECTIVE COURSES ELECTED?

Robert F. Grose, Office of Institutional Research, Amherst College

I. Introduction

My own interest in finding out more about elective courses and how they get to be that way stems from several sources. There has been a major trend toward higher proportions of electives in our curricula. We have also been trying to understand more about the learning histories of individual students and how much value has been added in their learning development during the college years. Elective courses provide us with both clues and questions.

The current highly sensitive reaction to course enrollments by individual faculty, departments, programs, administrators, trustees, and students invites us to understand better how to project course enrollments. Staffing, advising, funding, scheduling, all provide occasions for wanting to know why students take certain courses.

Although precursors can be discovered, the general movement to an elective curriculum is ordinarily attributed to Charles W. Elliott who became President of Harvard in 1869. He had spoken out before his inauguration and continued to champion an increasingly elective curriculum. Frederick Rudolph's Curriculum, A History of the American Undergraduate Course of Study (Rudolph, 1977) as well as several recent books by Arthur Levine on past and current curricula in higher education supply very helpful background.

Rudolph demonstrated that the change from a college to a university was facilitated by the elective system. He further noted:

> "President John E. Bradley of Illinois College was probably unaware of both Galton and Cattell when, early in the 1890's he observed: 'To my mind the object of elective studies is not so much to permit a student to choose those branches which bear upon his future work as to enable him to select such as will interest him and thus lead his mind to act with greatest vigor.' Neither the old school nor the new school had the final answers on how the human mind worked; the new school may have helped to kill off some of the silly pretensions that had been advanced in the name of Greek, but it did not eliminate the idea of mental discipline and training, of habit and routine and work as sources of intellectual vigor."

Rudolph goes on:

> "Edwin E. Slosson's verdict on the elective system was also a pronouncement on the new and old schools of psychology: 'That many students abuse the elective system is obvious, but the prescribed system abuses many students, and this is worse.'

II. Concepts

Space does not allow further exploration of the intriguing history of the role and nature of electives in our undergraduate colleges and universities. On one extreme we have a concentration or major almost always being required for students. In addition to the concentration we have some sorts of general education courses sometimes referred to as core. The same courses are sometimes prescribed for all students or groups of students (common courses), but more often a distribution is introduced within which there are partial electives under prescribed groupings. Finally, there are free electives that go to make up the remainder of the students' required number of courses whether by semester, year, or degree program.

But we must keep in mind another distinction. A course taken by one student for his or her major may constitute a free elective for another student. Certain concentrators must take prescribed courses, whereas other students may elect to take those identical courses (or on the other hand may be prevented by regulations from taking those courses.) From institution to institution the amounts of the student's program consisting of general education distribution and of concentration will vary and hence will the proportion of free electives. Moreover, even within the major or concentration there are often some"elections" from groups of courses within the major field.

At Amherst College, the proportion of courses required for the bachelor of arts degree that can be devoted to free electives has changed considerably over the years. Professor Hugh Hawkins, a member of the Select Committee on the Curriculum, recently wrote some of this history for us. In one of his tables here attached (Appendix I) the entry for 1875-76 shows only 15% of the courses were free elections. By 1905, Amherst had followed Harvard and moved to some 75% electives in its curriculum. Things changed and in 1946-47, Amherst introduced a curriculum in which the first two years were predominately courses common to all students. The proportion of electives dropped to 29%,

but then by the early Seventies, the faculty had moved back to allow some 75% of courses to be free electives for students.

It is with this background that I encountered a continuing problem for me as an institutional research investigator. With such a wide opportunity for students to elect courses, and without any distribution specified, it became more and more difficult to describe to the College community just what students did take. We evolved a simple count as a crude way of showing what many of the students did and produced summaries of the courses elected by graduating classes throughout their time at the College. Table A, for example, shows the way in which the Humanities majors distributed their 3301 courses in their four years. Amherst is part of a Five-College Consortium so some courses were taken off campus at the other institutions: Hampshire College, Mount Holyoke College, Smith College and the University of Massachusetts. Here are some 264 courses or 8.9% of their total courses (Appendix II).

This and similar tables are developed somewhat as a course load matrix, but rather than limiting ourselves to a single semester or year, the packets of courses taken by each student (no matter in which year) are the vehicles for analysis. Another example is found in Table F (Appendix III) which shows for several years whether students tried either one course or more or none in a particular department. (The full report on these election patterns is available from the Office of Institutional Research at Amherst College.)

It was my examining some of these data that led me more and more to question what really were the reasons for students electing courses outside their major. We have also noticed a phenomenon in which some 17% or 18% of the most recent classes have chosen to elect two separate majors and completed both.

III. Factors and Reasons

What can we say about the kinds of possible factors judged to be of importance in influencing students to make a particular selection among the courses available?

A. First we must recognize a variety of requirements or partial requirements. Some distributional requirements will have strict alternatives of specific courses. Curricula will differ in the looseness or degree of flexibility as well as the number of alternatives

they offer for satisfying requirements. We have requirements for graduation alone; the possibility of a course being a pre-requisite or requisite for yet another desired course, whether a course is thought to be helpful in terms of the local lore to prepare for another course. The general education distribution requirement will supply added directives. Some students evaluate courses as possibly useful for admission to graduate professional schools or other post-baccalaureate study. All of these factors are in addition to the courses required for the major.

B. We know something from our experience as to the sources of information available to students about courses. We do not know, however, much about how to sort out the differential effects of the Catalog itself, registration materials, word-of-mouth, course syllabi, graduate school catalogs, an interview with the instructor and so forth, as sources of information. The sources of information also overlap the particular sources of influence or recommendations. These are found not only in printed materials but among students and other effective individuals. That is, influence may come from an academic advisor; especially for freshmen; a secondary school guidance counselor; individuals at the department level; the registrar; another faculty member; the instructor of the course; Deans; parents; family; siblings; general higher education directories and so forth.

One study carried out at Williams College showed both sources and agents within the same list for the group of freshmen entering in 1977. College materials were judged by the students involved to have been the major influence (86% major or some influence). Parents and relatives were also important (46%). Even though these were students making their first course elections by mail prior to coming to Williams College, Williams students were mentioned by 29% indicating that the summer grapevine may extend quite a distance.

Our studies of some of these matters, however, are not very complete as yet and offer some interesting cautions. Borgida and Nisbett (1977) demonstrated that students paid greater attention to course information given by two or three students on a T.V. monitor than they did to a quantitative summary of course ratings from over a hundred students! As the authors point out, "subjects in the present studies may have discounted the population that generated the base rates [for course evaluation] as being of dubious comparability to themselves: 'who are these

people anyway? I don't know them.' In the face-to-face condition they saw the people who generated the evaluation they could tell for themselves that they were reasonable people whose views could not be discounted." (Page 270.)

C. The real reasons for choice by students are both complex and numerous. So far I have only begun my taxonomy of such reasons as I have discovered that such a classification is somewhat idiosyncratic so far and not very well-understood or standardized. Here are some of the reasons I have developed, however:

1. Some note that the chosen course may involve a familiar subject - one that the student likes or alternatively, one that the student does well in. Ken Wilson at Educational Testing Service in analyzing the power of achievement test scores to predict freshman grade point performance notes that with an elective high school curriculum and an elective college curriculum in freshman year, one discovers many continuations and even overlaps with high school courses. This results in higher correlations than might be the case for new courses and it may well explain the high correlation between certain achievement test averages and freshman GPA. It does raise the possibility that the student may choose to continue and be comfortable in a familiar subject even at the cost of a high proportion of repetition; some want to play it safe.

2. Many areas of choice seem to be simply an expression of interest, whatever that means. In some ways, this could be circular, in that by definition: if someone engages in something there must be some interest and we tell whether an individual has interest by seeing what he engages in. Some would note the exploration for possible interest and it is not unusual in some institutions for students to explore broadly for a possible major concentration. In a recent study of career development in samples of students at seven selective liberal arts colleges, Haagen discovered that the alternative endorsed by far the greatest plurality of students was "a subject in which I have a great deal of interest" even when compared to the poll of requirements (Haagen, 1982).

3. Another cluster of reasons seems to be the general desire of students for a diverse education "to be balanced" "to spread out" "to have a liberal arts experience."

4. Related to this but attached to the current semester is the desire of the student to provide for himself or herself a variety or

balance to the other courses in his or her current schedule. Preference for "diversity" in the modes of instruction, the subject matter, the pace, the workload, and all the other course features seem to be involved. Variety seems to be more prized in course-taking than homogeniety.

5. A whole cluster of factors are found relating to the quality and reputation of the professor, that is, the charisma, and the reputation of the instructor. It is not unusual to find students saying "you certainly want to take a course with Professor X before you graduate." This is found in the selection of sections in psychology by Leventhal, et al, (1975).

6. However, it is not solely the professor; there is also the evaluation of the course and its reputation. "The course is an excellent course."

7. There are reasons offered by at least some students that are less complimentary to the strength of the educational enterprise. It is not unusual to have students say "I thought I could get a good grade." Or "it appeared to impose a somewhat lighter work load." Students are motivated to maintain high averages, to seek lighter courses to go along with particularly difficult required courses or thesis project work loads. There is a somewhat apochryphal story about Robert Benchley and his course choices. When he was asked why he happened to choose such a peculiar major at Harvard, he replied that the reason he chose the combined major of industrial archeology and Turkish tapestry studies was that he had simply insisted that each of his courses would have to be after 11:00 a.m., prior to 3:00 p.m. and not be above the first floor.

8. Certainly these days the relation of the course to a career or job will have a high valence for many. Who has not heard "insurance" mentioned or "market utility."

9. There are some other more social reasons - one's boyfriend or girlfriend may be taking the course, one's group of friends or roommate.

10. Supposedly one could dig deeper and find that some students are electing certain courses not as a matter of approach, but rather of avoidance. That is, they may be avoiding other courses and take the least uncomfortable alternative.

11. What we do not see too often are those individuals who take courses because such courses are challenging or that would extend the individual beyond what he or she is now able to do.

IV. Added Considerations

A. It is likely that there are different reasons or factors at different levels of advancement through the curriculum. That is, freshmen may select several courses to explore possible majors. Seniors, for example, may be looking for areas that they have omitted and now wish to have some sense of completion, whether it be a foreign language or a course in accounting. Where there is a special program in senior year such as senior honors or a thesis, then such factors as a course's limited reading load may influence course elections simply in terms of intelligent time management.

B. Information about student choice could also be contributed by studies of why students drop courses or withdraw from them. That is, if we could find the reasons why students left courses we would have some indirect information on the effectiveness of certain motivations for selecting those courses. (e.g.See Reed, 1981.)

C. Temporal sequence goes not only from the high school but also continues on to activity after college. It is even suggested that continuing education or adult education will often consist of "postponed electives." (Levine, 1979.)

Certainly the shifting views of prescription and freedom influence what the student has to choose among and the proportion of his work that may be so chosen. The trinity of concentrations/distributions/ elective classification of courses says a good deal of the institution's attitude toward its students. In the Sixties and Seventies there were some institutions which forthrightly proclaimed that the student will have to select his/her learning experience after college and that it seems wise to start the student during college to take over control of his or her own education. Hence, a good number of electives.

D. Data on student course election could be used to evaluate advising, to estimate the value of freshmen orientation, to evaluate curricular programs, and to perhaps even monitor over time the preparation of secondary schools. Depending on the circumstances and point of view, a student's choice of electives may be the input (or independent variable), part of the process or treatment, or finally a part of the outcome (dependent variable). These call for a whole program of study with hardly satisfying

answers yet to my original question.

E. Colleges and universities do not generally annotate the nature of the elective choices in their recording of student learning on the transcript. Chronological transcripts usually give no indication whatsoever of whether the student is completing a required activity or one that he or she selects freely.

We have only a few of the pieces of this complex picture puzzle. Not even all the edges are visible yet. The shape and colors of some of the different pieces remain to be seen. The process by which a student elects courses and the reasons motivating those choices will require considerable lengthy and sophisticated investigation. The factors are complex and so far it appears that any one factor seems to relate only to a small portion of the variance across courses and across institutions. The growing emphasis on enrollment data, however, and the considerable interest both by curricula architects and funding agencies in knowing more about students electing certain courses leads to the probability that we in institutional research will be coping with such problems.

Note: Reports and added tables are available from the author. He also wishes to acknowledge the generous sharing of data by Dr. David Booth and Dr. Hess Haagen as well as the bibliographic searches by Philip Nelson and the essential tabulations and clear presentations by Lois Hill.

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EDUCATION AT AMHERST RECONSIDERED

Free Election and Requirement in the Amherst College Curriculum

(Percent of courses required for the B.A., approximated from Catalog Statements)

Year	*% Free Election*	*% Major*	*% Required Distribution*	*% Required Specific Courses[a] (Included in Required Distribution)*
1875–76	15		85	(85)
1885–86	38		62	(62)
1895–96	56		44[b]	(38)
1905–06	75	—[c]	25[d]	(20)
1915–16	35	30[e] (two majors)	45	(20)
1925–26	40	30[e] (two majors)	40	(15)
1935–36	45	15[f]	55[f]	(0)[g]
1945–46	45	25[h]	40	(5)
1955–56	29	23	48	(23)
1966–67 (plan adopted 1965)	44	25	31	(9)
1975–76	75	25	0	(0)

[a] Choices limited to Greek and Latin, or to French and German, are counted as specific requirements. In no case has a foreign language *proficiency* requirement been counted.

[b] Only one study was a requirement met by a "distributional" choice: one of four studies in the sophomore year was to be mathematics or a natural science.

[c] There was no major, but to be eligible for "Final Honors," a student was required to take four semester courses in a single department—9% of all course work.

[d] Required distribution, apart from specific courses, consisted in freshmen's choice of two courses out of a list of eleven.

[e] There is a 10% overlap of the major with either courses taken as distribution requirements in the sophomore year or with free electives of the last two years. This overlap explains the total of 110%.

[f] In each of the last three years, students were required to take two year-long courses in two subjects in which courses were taken the preceding year. This "continuity" requirement has been counted here as a distributional requirement. In most cases, courses taken to give continuity also constituted the major, hence the total of 115%.

[g] Throughout this table, the required fractional course in public speaking, generally a third or a fourth of a regular course, has not been counted. Since in 1935–36 a "one-hour" course in public speaking was required of freshmen, the figure of "0" here might better be rendered "1." Similarly, fractional physical education and hygiene courses, though usually required, have not been counted.

[h] A 10% overlap of the major and distribution requirement was probable.

Taken from: Select Committee on the Curriculum, Education at Amherst Reconsidered: The Liberal Studies Program: Amherst, Massachusetts, Amherst College Press, 1978.

APPENDIX II

Table A

ELECTIONS OF COURSES
CLASS OF 1982 & 82E - AMHERST
4 YEARS

COURSES IN:	HUMANITIES 113 MAJORS		SOC.SCI. 171 MAJORS		NAT.SCI. & MATH 70 MAJORS		OTHER 9 MAJORS		OVERALL 363 MAJORS	
	Courses Elected		Courses Elected		Courses Elected		Courses Elected		Courses Elected	
	N	%	N	%	N	%	N	%	N	%
Art (Fine Arts)	227	6.9	97	1.9	67	3.2	11	4.3	402	3.8
Classics	68	2.1	95	1.9	44	2.1	3	1.2	210	2.0
Drama	109	3.3	68	1.4	15	.7	7	2.7	199	1.9
English	638	19.3	334	6.7	136	6.5	15	5.7	1123	10.6
French	141	4.3	104	2.1	14	.7	9	3.5	268	2.5
German	74	2.2	27	.5	19	.9	7	2.7	127	1.2
Greek	31	.9	8	.2	6	.3	-	-	45	.4
Latin	40	1.2	9	.2	8	.4	-	-	57	.5
Music	145	4.4	148	2.9	94	4.5	15	5.7	402	3.8
Philosophy	125	3.8	146	2.9	55	2.6	3	1.2	329	3.1
Religion	117	3.5	77	1.6	21	1.0	2	.8	217	2.0
Russian	114	3.5	72	1.5	27	1.2	4	1.5	217	2.0
Spanish	70	2.1	57	1.2	13	.6	-	-	140	1.3
TOTAL	1899	57.5	1242	25.0	519	24.7	76	29.3	3736	35.1
American Studies	21	.6	166	3.3	6	.3	3	1.1	196	1.8
Anthropology	72	2.1	174	3.5	44	2.0	7	2.7	297	2.8
Black Studies	36	1.1	111	2.2	31	1.5	1	.4	179	1.7
Economics	70	2.1	553	11.1	62	3.0	23	8.6	708	6.7
History	144	4.4	383	7.7	47	2.2	11	4.3	585	5.5
Political Sci.	149	4.5	647	13.0	57	2.7	10	3.9	863	8.0
Psychology	75	2.3	360	7.3	130	6.2	7	2.7	572	5.4
Sociology	38	1.2	149	3.0	19	.9	2	.8	208	2.0
TOTAL	605	18.3	2543	51.1	396	18.8	64	24.7	3608	33.9
Astronomy	17	.5	44	.9	24	1.1	2	.8	87	.8
Biology	70	2.1	65	1.3	244	11.6	7	2.7	386	3.6
Chemistry	61	1.9	52	1.1	198	9.4	5	1.9	316	2.9
Geology	21	.6	44	.9	102	4.8	8	3.1	175	1.7
Mathematics	84	2.5	178	3.6	174	8.3	8	3.1	444	4.2
Neuroscience	-	-	1	-	6	.3	-	-	7	.1
Physics	54	1.7	71	1.4	182	8.7	2	.8	309	2.9
TOTAL	307	9.3	455	9.2	930	44.2	32	12.4	1724	16.2
Asian Studies	13	.4	32	.6	9	.4	19	7.3	73	.7
Colloquium	9	.3	17	.3	3	.1	1	.4	30	.3
European St.	19	.6	9	.2	4	.2	20	7.7	52	.5
Field Study	-	-	-	-	-	-	-	-	-	-
Freshman Sem.	2	.1	8	.2	4	.2	-	-	14	.1
Ind. Scholar	-	-	-	-	-	-	-	-	-	-
Interdis.	-	-	-	-	-	-	3	1.2	3	-
Inquiry	1	-	-	-	-	-	-	-	1	-
Kenan	-	-	-	-	-	-	-	-	-	-
Mellon	4	-	7	.1	1	.1	-	-	12	.1
TOTAL	48	1.5	73	1.4	21	1.0	43	16.6	185	1.7
ILS	178	5.4	284	5.7	114	5.4	14	5.4	590	5.6
(Amherst)					3	.2			3	-
Hampshire	33	1.0	43	.8	13	.6	2	.8	91	.9
Mt. Holyoke	69	2.1	98	2.0	36	1.7	5	1.9	208	2.0
Smith	83	2.5	69	1.4	21	1.0	8	3.1	181	1.7
U. Mass.	79	2.4	168	3.4	50	2.4	15	5.8	312	2.9
TOTAL	264	8.0	378	7.6	123	5.9	30	11.6	795	7.5
GRAND TOTAL	3301	100.0	4975	100.0	2103	100.0	259	100.0	10638	100.0

Office of Institutional Research
Amherst College - June 1982

APPENDIX III

Table F

FOUR-YEAR CUMULATIVE COURSE ELECTION OF STUDENTS BY GRADUATING SENIORS AT AMHERST COLLEGE

DEPARTMENT	CLASS OF 1978 N = 356 % Elect 1 or More Courses in Dept.	% Not Elect Courses in Dept.	CLASS OF 1979 N = 344 % Elect 1 or More Courses in Dept.	% Not Elect Courses in Dept.	CLASS OF 1980 N = 379 % Elect 1 or More Courses in Dept.	% Not Elect Courses in Dept.	CLASS OF 1981 N = 422 % Elect 1 or More Courses Dept.	% Not Elect Courses in Dept.	CLASS OF 1982 N = 363 % Elect 1 or More Courses in Dept.	% Not Elect Courses in Dept.
Art (Fine Arts)	57%	43%	54%	46%	70%	30%	66%	34%	53%	47%
Classics	33%	67%	31%	69%	38%	62%	41%	59%	45%	55%
Dramatic Arts	25%	75%	36%	64%	31%	69%	32%	68%	30%	70%
English	85%	15%	86%	14%	88%	12%	89%	11%	89%	11%
French	22%	78%	26%	74%	27%	73%	28%	72%	33%	67%
German	20%	80%	15%	85%	16%	84%	18%	82%	12%	88%
Greek	6%	94%	6%	94%	4%	96%	3%	97%	4%	96%
Latin	6%	94%	8%	92%	6%	94%	7%	93%	8%	92%
Music	45%	55%	51%	49%	59%	41%	64%	36%	61%	39%
Philosophy	54%	46%	62%	38%	63%	37%	59%	41%	51%	49%
Religion	28%	72%	33%	67%	28%	72%	32%	68%	36%	64%
Russian	21%	79%	25%	75%	35%	65%	44%	56%	34%	66%
Spanish	23%	77%	29%	71%	26%	74%	25%	75%	20%	80%
TOTAL	99%	1%	99%	1%	99%	1%	100%	-	100%	-
American Studies	25%	75%	27%	73%	27%	73%	26%	74%	25%	75%
Anthropology	31%	69%	32%	68%	40%	60%	42%	58%	50%	50%
Black Studies	16%	84%	17%	83%	26%	74%	23%	77%	30%	70%
Economics	62%	38%	62%	38%	65%	35%	64%	36%	60%	40%
History	69%	31%	65%	35%	67%	33%	65%	35%	66%	34%
Political Science	65%	35%	66%	34%	74%	26%	75%	25%	73%	27%
Psychology	58%	42%	55%	45%	62%	38%	62%	38%	57%	43%
Sociology	28%	72%	34%	66%	37%	63%	41%	59%	35%	65%
TOTAL	98%	4%	97%	3%	99%	1%	99%	1%	99%	1%
Astronomy	12%	88%	13%	87%	20%	80%	28%	72%	19%	81%
Biology	45%	55%	43%	57%	44%	56%	46%	54%	37%	63%
Chemistry	33%	67%	34%	66%	34%	66%	34%	66%	34%	66%
Geology	17%	83%	18%	82%	24%	76%	30%	70%	21%	79%
Mathematics	53%	47%	55%	45%	65%	35%	65%	35%	66%	34%
Neuroscience	1%	99%	2%	98%	1%	99%	2%	98%	1%	99%
Physics	44%	56%	48%	52%	51%	49%	47%	53%	43%	57%
TOTAL	77%	23%	78%	22%	84%	16%	87%	13%	84%	16%
Asian Studies	7%	93%	19%	81%	18%	82%	13%	87%	11%	89%
Colloquium	40%	60%	24%	76%	20%	80%	15%	85%	8%	92%
European Studies	15%	85%	5%	95%	10%	90%	7%	93%	9%	91%
Field Study	1%	99%	*	100%	*	100%	-	100%	-	-
Freshman Seminar	50%	50%	42%	58%	54%	46%	30%	70%	4%	96%
Ind. Scholar	1%	99%	1%	99%	*	100%	1%	99%	-	-
Inquiry	-	-	1%	99%	-	-	-	-	*	100%
Interdiscip.	2%	98%	4%	96%	5%	95%	2%	98%	1%	99%
Kenan	17%	83%	16%	84%	6%	94%	1%	99%	-	-
Mellon	6%	94%	8%	92%	6%	94%	8%	92%	3%	97%
TOTAL	78%	22%	76%	24%	74%	26%	59%	41%	30%	70%
ILS	-	-	-	-	-	-	-	-	79%	21%
Hampshire	15%	85%	19%	81%	16%	84%	16%	84%	15%	85%
Mount Holyoke	47%	53%	44%	56%	35%	65%	36%	64%	36%	64%
Smith	54%	46%	45%	55%	37%	63%	38%	62%	30%	70%
Univ. of Mass.	46%	54%	49%	51%	45%	55%	42%	58%	44%	56%
TOTAL	90%	10%	84%	16%	79%	21%	80%	20%	73%	27%

*Less than 1%

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IMPROVING THE QUALITY OF DATA OBTAINED THROUGH SURVEY RESEARCH

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Introduction

Several years ago, the Institutional Research Office at Community College of Philadelphia (CCP) decided to systematically gather data on an ongoing basis from a variety of subgroups associated with the Institution[1]. As a result of this decision, data collection efforts at CCP became heavily reliant on the use of the mail-out questionnaire. Much of the appeal of this data collection method stemmed from its ability to provide an efficient means to gather large amounts of data at a relatively low cost in a short period of time.

The standard data collection procedures included one mail-out of the survey instrument, cover letter and postage-paid envelope to all survey participants, followed in three weeks by a post card reminder to all nonrespondents to the initial mailing.

Despite the relative economy of this survey approach, the associated response rate (20%) was often unacceptably low[2]. Since the respondents to these surveys did not represent a randomly selected group from the survey population, a question concerning the quality of the data was frequently raised.

In an effort to maximize the quantity and quality of information gathered through institutional surveys, a series of experimental data collection procedures were put into motion. Built into each ongoing survey that was designed to gather information pertinent to the functioning of

the Institution, was a research component that was designed to provide answers to methodological issues that would eventually reduce errors at the data collection stage, largely through improving responses rates. By using this approach over the last several years, a reservoir of information has developed which has been successfully applied to subsequent survey research conducted at CCP. Most of the experimental information can be broadly categorized as either data collection procedures or questionnaire redesign.

When a particular procedure has been found to positively affect the survey response rate, a crude cost-benefit analysis is made in order to determine if the procedure should be incorporated in future institutional surveys. (A cost chart used for this analysis appears in appendix A).

REDESIGN OF DATA COLLECTION PROCEDURES

Consideration of data collection procedures included analyzing the effects of introductory preletters, postage-paid envelopes, rewards and personalization on response rate; studying effective methods for following up on nonrespondents; examining the quality of data collected face-to-face versus through the mail and surveying random samples rather than entire populations.

Nonrespondents Follow-up Procedures

As stated earlier, the standard data collection procedure at CCP included an initial mail-out of a cover letter, questionnaire and postage-paid envelope, followed three weeks later by a postcard reminder to nonrespondents, netting approximately a 20 per cent return on the questionnaire.

Based on the suspicion that many of the nonrespondents to the initial mailing had discarded the original copy of the questionnaire and return envelope by the time a follow-up reminder was sent, a decision was made to include these two items with the reminder to nonrespondents in a subsequent survey. This additional procedure resulted in enlarging the overall response rate by approximately 10 to 15 per cent.

The cost of each additional questionnaire gathered by this approach was approximately $1.28 (based on an initial return of 20 per cent and follow-up return of 15 per cent).

Before evaluating the added cost of the procedure against the increased response, it was decided to add one more step to the process that would enable an assessment of the quality of the extra data that was collected. In order to do this, a 10 per cent sample of randomly selected nonrespondents of the mail-out questionnaires, selected from both surveys, was interviewed over the telephone. The questionnaire used for the mail survey served as the telephone interview instrument.

Since the participants in the telephone survey were based on a random selection, an assumption was made that the information gathered by this means was more representative of the overall survey population than was the information gathered through the mail survey of self-selected respondents. Comparisons of participant demographics and survey responses between the mail and telephone groups indicated that a small amount of bias was present in the mail data, however, inclusion of the data obtained from the mail nonrespondent follow-up helped to normalize the mail survey information.

Based on these findings, a decision was made to routinely include a questionnaire and postage-paid envelope in future survey follow-ups to nonrespondents and to include a telephone follow-up of a randomly selected group of nonrespondents in order to check for the presence of response bias.

Introductory Preletter

A fairly common survey procedure includes the use of an introductory preletter sent to potential respondents a short time before the arrival of the questionnaire. It is anticipated that a preletter has a positive effect on response rate.

In order to test this possibility, half of the potential respondents in a survey received a preletter approximately one week prior to the arrival of the questionnaire. For the remaining survey particpants, the arrival of the cover letter and questionnaire served as the introduction to the survey.

Analysis of response rates associated with the different groups indicated that individuals who received an introductory preletter were three per cent more likely to respond, however the differences between group response rates were nonsignificant χ^2 (1) = .58, n.s. for graduates, and χ^2 (1) = .56, n.s. for non-returners.

These results, taken into consideration with the cost per additional questionnaire ($3.46), led to a decision that a preletter would not be incorporated into the data collection methods for these two surveys.

Personalization

One of the more interesting findings occurred serendipitously, as a result of time constraints rather than intentional design.

Great care has always been taken to ensure that professional impression is conveyed to survey participants. Identifying information has been typed on all correspondence.

In the middle of preparing survey materials one year, the Institutional Research Office found itself pressed for time and in the interest of meeting mailing deadlines, only half of the surveys had typed identifying information and mailing envelopes, while the other half were handwritten. The response rate to the survey that year increased by seven per cent.

In the next go around of the survey, identifying information and envelopes were handwritten for all survey participants. This approach produced an increase of thirteen per cent in response from the original all typed format.

Based on these results, this information will continue to be handwritten at no extra cost.

Postage-Paid Envelopes

Inclusion of a postage-paid envelope for the return of the completed questionnaire has been regularly included in CCP survey procedures. The reason for doing so had been based on the assumption that the envelope will increase the likelihood of response. In order to determine if it would be cost effective to continue this practice a College survey was administered eliminating the postage-paid envelope from the process.

The returns form this survey were compared to the returns from a similar survey conducted the previous year. The survey with the envelope had a response rate that was seven per cent greater than the survey without the envelope, χ^2 (1)=53.2,p .000. The cost was approximately $0.30 per additional questionnaire. A decision was made to continue the use of postage-paid envelopes as a standard survey procedure.

Face-to-Face Data Collection

In the interest of cutting survey costs through the elimination of mailing expenses, the Course Withdrawal questionnaire was distributed by college personnel who were responsible for expediting the course drop process. This data collection approach appeared feasible since students had to report to a centralized location in order to complete the necessary paper work to drop a course. In addition to a drop slip, college personnel were instructed to request that the student complete the Course Withdrawal questionnaire.

By semester's end, 1,383 questionnaires were completed. This number represented only 24 per cent of all course withdrawals in the semester, far shy of the 100% hoped for through this method of collection.

In order to check on the quality of the data, a 10 per cent randomly selected sample of students who withdrew from a course during the semester and had not already completed a questionnaire were sent a survey form. Sixty four per cent (64%) of the sample returned a questionnaire,

An assumption was made that the response from the mailed out method was more representative of the survey population since it was based on a randomly selected sample, while the face-to-face response were in all likelihood subject to sampling bias by personnel responsible for questionnaire distribution. With this in mind, questionnaire responses, student demographics and course information were compared for the two distribution types. These analysis indicated that a great deal of bias was present in the face-to-face data and that statistical corrections for the bias would be needed before the survey information could be analyzed meaningfully.

Since the quality of the data collected face-to-face was so poor, it was decided to forego this method of data collection and mail out future Course Withdrawal surveys.

Population Vs. Sample

Approximately 6,000 courses are dropped by CCP students in a semester. This large number makes the administration of a mail out course withdrawal questionnaire an expensive process, approximately $1,500. In order to cut costs, the questionnaire recipients were limited to a 20 per cent randomly selected sample (cost of $300) that was stratified in order to ensure proper course representation.

Useable questionnaires were obtained from 20 per cent of the sample. A telephone follow-up of nonrespondents was conducted and comparisons of these surveys results were made with the mail sample survey results. These comparisons indicated there were very few difference in survey results between the telephone and mail responses. In addition, returns by dropped courses represented institution wide figures.

As a result, this questionnaire will continue to be sent to a stratified random sample of students rather than the entire population.

REDESIGN OF SURVEY QUESTIONNAIRES

Experimental factors discussed up to this point can be generally categorized as data collection procedures. In addition to this group of variables, several items related to the design of survey questionnaires have been studied.

The time for replacing the dwindling supply of questionnaires appeared to offer a perfect opportunity to consider strategies related to questionnaire format that might improve the quality of the information gathered through the forms. Professional layout of the questionnaire, color, length and question phrasing were considered.

Professional Layout

Questionnaires originating in the Institutional Research Office have always been professionally designed, conveying an air of importance to the survey participant through the questionnaire's neat and orderly appearance. It has been assumed that the more important the questionnaire appears to be, the more likely it will be completed and returned.

The questionnaires have generally been one of two types, a technical opscan-readable form or a machine-typed duplicated form. Although both forms are identical in content, neat and orderly, they differ in some important respects. The technical form is one sheet, printed back-to-back while the typed form is a multi-paged, stapled document. The technical form

also looks more expensive (cost approximately $0.02 more per questionnaire to produce) than the machine-typed form. For these two reasons, the technical form might produce a greater response than the typed form.

In order to determine if questionnaire format has an effect on response rate, half of the potential respondents to survey were sent the technical form while the other half were sent the machine-typed form. Significantly more of the technical forms were returned, $\chi(1)=4.42, p \leq .05$.

Weighing the added cost of the technical form against the increased response of eight per cent, a decision was made to use technically designed forms, where possible, in future surveys.

Questionnaire Length and Question Format

As noted in the previous section, technically designed forms produced greater response rates than did machine-typed forms. Two factors were hypothesized as explaining this result, the importance of the information conveyed by the technical form and the brevity possible from this type of form. In order to determine if questionnaire length alone would affect response rate, a questionnaire was redesigned to include five questions, printed on a single side, postcard sized form. The survey form used prior to this year contained 25 items printed back-to-back on 8" x 11" page.

Responses from this short form were compared to the most recently collected standard length form. This comparison seemed reasonable since the surveys were conducted only one year apart and they had the same size populations and the same population definitions.

Three per cent (3%) fewer of the short surveys were returned, $\chi^2(1)=.82$,n.s. Part of an explanation for this result is that the longer form, which is the standard questionnaire length for most institutional surveys, probably has not reached an unacceptable limit and is therefore as likely to be returned as a shorter form.

An additional feature was built into the experimental short form that was designed for the Nonreturning Student Survey. It fell into the area of question format: the issue of open versus close ended question types.

A major objective of the survey is to learn the reasons why a student did not re-enroll at the College in subsequent semesters. The questionnaire item designed for this purpose has appeared in past surveys as a multiple choice question, which provided the respondent with 14 options, including an "other" category. In recent years, the number of respondents reporting other reasons has increased (30 per cent), along with a suspicion that the forced choice alternatives associated with the question no longer adequately covered the full range of reasons for nonreturn. This seemed to be reasonable since the questionnaire had been designed in 1976.

In order to develop choices that would more realistically represent the current survey population, the question on the redesigned short form left the reason for nonreturn open ended, thereby avoiding the suggestion or imposition to answers to the respondent.

Comparisons of responses from the most recently collected forced choice format with the open ended format indicated that the latter approach was less likely to elicit a socially acceptable response. Five per cent (5%) of the forced choice respondents indicated they did not re-enroll because of academic reasons, while 19 per cent of the open ended respondents indicated they had academic problems.

Even though the open ended responses produced more work since they had to be hand tabulated, it was decided to employ this format in future surveys. The greater degree of specificity and greater likelihood of unanticipated reasons provided by this type of question, will help in the development of institutional retention strategies.

Questionnaire Color

A number of individuals responsible for conducting survey research are proponents of the use of colored forms in order to increase rates of response. The reasoning is that the colored form will attract the potential respondent's attention and after having done so, will increase the likelihood of that person completing the questionnaire.

In order to determine if this procedure might be employed effectively at CCP, 500 participants in a survey of currently enrolled students received a questionnaire and cover letter printed on blue paper while the remaining 500 received white forms. Question wording and all other survey procedures were identical for the two groups. Thirty five per cent (35%) of the blue forms were returned and 27 per cent of the white forms. The eight per cent difference in response rate was significant, $\chi^2(1)+5.7, p\ .05$, however, duplication of this procedure in subsequent surveys, while producing results in the same direction, failed to reach significant levels.

The difference in cost of the colored forms is minimal, therefore a decision was made to use colored forms in subsequent surveys.

Conclusion

Various survey methods were tested in conjunction with ongoing Institutional surveys. The purpose of this research was to develop survey methods that would maximize response rates while remaining relatively inexpensive. The results of this research has led to survey procedures that have doubled response rates to some Institutional surveys. In turn, the larger response rates have produced a greater degree of confidence in the data collected by survey methods.

Notes

1. The questionnaires imployed in survey research at CCP were adapted from those developed by Project Follow-up of the Tex-Sis system.

2. Response rate is defined as the total sample minus all incompleted surveys divided by the total sample.

3. Since the nominal variables throughout this paper are dichotomous, the chi-square analyses included Yates Correction for Continuity. Yates' Correction consists of subtracting .5 from the absolute difference of the observed frequency minus the expected frequency before squaring. This correction provides a better approximation to the theoretical χ^2 curve.

APPENDIX

Cost of Mailed Survey Materials and Personnel

Item	Description	Cost per potential Respondent
Questionnaires	Typeset and printed technical form; or 3 or 4 typed pages, reproduced	$0.10
Cover letters	Typed and printed on letterhead paper	0.027
Return envelopes	Business reply postage paid envelope: returned nonreturned	0.20 0.027
Mailing envelopes	Letterhead	0.027
Postage	Bulk Mail Rate (minimum of 200 pieces, pre-sorted in zip code order)	0.038
Personnel	7.5 hours to collate, fold, and stuff 300 surveys at $3.35/hour minimum wage (cost of work-study students)	0.08

DEGREE PATTERNS AND ENROLLMENT TRENDS

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Research may serve a variety of purposes. The purposes could be placed on a continuum of utility from practical to theoretical. I have been studying degree data from New York State for the past three years and suggested in my last paper (Hester, 1981) that degree patterns reflect responsiveness, a more practical concern for many might well be forecasting enrollment trends. The present paper presents tabulated degree data for three separate years and also develops occupational data into comparable units. The basic question which this paper addresses is whether changes in degree production correspond with changes in size of occupational groups and if so, how will future enrollment be affected? The degree is an end product of the higher educational system (I use the word "system" in an open sense) and may therefore be considered as an output measure. As such, it says something about activities earlier in the cycle within the system. For the institutional planner the interest may simply be in projecting the future direction of programs, departments or schools within a system. If degree production is related in some way to occupational changes, then forecasts of occupational change, if realized in reality, will at sometime impact the campus with a change in demand for programs. Obviously, program resource allocators would like to know what future trends are likely. There are a variety of sources for forecasts of future occupational trends. The basic question however, is whether program demand is in anyway related. There are a number of more theoretical concerns which this research may illuminate and they will also be discussed.

The Study-Broad Background

New York State has an extensive public and private system of higher education. It is therefore, an ideal state to study at the macro level. Within the public sector there are two major systems. SUNY, the State University of New York and CUNY, the City University of New York; respectively the first and third largest universities in the world. New York also has a highly developed economy; if it were a nation, it would have the ninth largest economy in the world. The private system of higher education is equally well developed, some of the most regarded institutions in the world are among them. In the period 1960 to 1980, nearly 2.4 million degrees were awarded. In 1960, the private sector awarded 70.7% of the degrees; by 1980, the public sector had increased its share to 51.2%. Neither sector however, in reality, exchanged pieces of the pie. This is because overall growth in degree production was 270 percent during the period. The private sector presently dominates production of advanced degrees (72.8%). While the public sector has the major task of awarding associate degrees in the ratio of 6 to 1.

Presently, in the State of New York degrees are awarded at five levels and in thirty main program areas (that is using the two digit HEGIS classification to define program area). Degree data is collected annually from institutions by the State Education Department as the Higher Education General Information Service (HEGIS) agent. The researcher was assisted by the Information Center on Education of the New York State Education Department. They provided basic annual data, from which extensive tabulations have been made.

Purpose of the Present Study

The degree data covers twenty years, the period 1960 to 1980. It is state-wide and has been broken out in a wide variety of ways. Extensive graphing revealed a variety of patterns throughout the period. Some programs grew, others contracted, some peaked and then declined, while some waved. Some of the differences might be culturally determined, but the major growth areas corresponded with the economic changes in society. It was hypothesized that while individual students choose programs for a variety of idiosyncratic reasons, there is an overall awareness of economic or external reality and that therefore program demand is basically economically driven. Students invest in their college education and expect a return. If this supposition is correct, then it is reasonable to expect that degree production patterns will be similar to proportion changes in the occupations of members of the work force.

Method

It was hoped to match the data for degrees with data on occupations drawn from New York State. Such data is apparently not accessible. The ideal would be to have annual occupation data to match the degree data and look at corresponding trends over the twenty years that the degree data covers. A proxy measure was found to be available in the form of the U. S Bureau of Labor Statistics National Industry - Occupation Employment Matrix Jan. 1970 and 1978. For a given industry, the matrix presents the proportion of total employment that is accounted for by each detailed occupation. The BLS industry - occupation matrices divide total U. S. employment into 425 occupations and 260 industries. The occupational classifications used in the matrices are based upon classifications used in the 1970 census of the

population, supplemented by employment data from other sources. The Bureau of Labor Statistics has updated the 1970 matrix to 1978, using current population survey data, analysis of historical census trends, and assumptions regarding factors such as changes in product mix or production methods that affect the structure of industries.

It was thought that if the 425 occupations could be compressed to the 30 HEGIS categories, then differences in the two survey periods could be compared with degree data for the same years. The crosswalk between the HEGIS Taxonomy and the new classification was used to allocate the occupations to HEGIS 2 - digit areas. The ratios for each year 1970 and 1978 were distributed and then eventually summated.

Degree data was aggregated, bachelors through doctoral for 1970-71, 1977-78 and 1979-80. Associate degrees were aggregated for the same periods. All were then transformed into proportions of their aggregate group. This was done to control variation from other variables such as changing population.

This study is clearly limited by comparing New York State degree data with national occupational data, to the extent that New York departs from the national picture. I have supplied percentage changes on the tables that follow, the main point however, was to produce a matrix of program - occupational change. An analysis of differences in rate of change would require other variables for which I do not have data.

Results

Tables 1 through 6 present the result of this macro data compression. Four HEGIS areas do not have corresponding occupation data, they are;Area Studies, Foreign Languages, Letters and Interdisciplinary Studies, programs

Table 1
Degrees Awarded Bachelors and Above
New York State 1970-71
1977-78 and 1979-80

HEGIS + Code	Program Area	1970-71	1977-78	1979-80
01	Agriculture and Natural Resources	629	850	758
02	Architecture and Environmental Design	804	1267	1274
03	Area Studies **	344	504	405
04	Biological Science	4197	6256	5861
05	Business Management	10872	18425	21705
06	Communications **	713	2641	3132
07	Computer and Info. Science *	408	1248	1823
08	Education	22012	20663	17421
09	Engineering	6485	6883	7570
10	Fine and Applied Arts	4498	6282	6293
11	Foreign Languages	3326	2122	1880
12	Health Professions	2881	8331	9109
13	Home Economics	663	1563	1371
14	Law	409	573	540
15	Letters	10381	6389	6151
16	Library Science	1161	850	700
17	Mathematics	3858	2007	1622
19	Physical Sciences	3418	3058	2769
20	Psychology	5574	6838	6439
21	Public Affairs **	1821	5779	6068
22	Social Sciences	18204	16743	15219
23	Theology	485	283	335
49	Interdisciplinary Studies	1561	5593	5324

* Degrees awarded from 1964-65
** Degrees awarded from 1969-70

Source NYSED: Postsecondary Information Systems/HEDS and Information Center on Education

\+ HEGIS: Higher Education General Information Service

Table 2
Associate Degrees Awarded
New York State, 1970-71
1977-78 and 1979-80

HEGIS Code	Program Area	1970-71	1977-78	1979-80
49	Arts and Science	12521	16274	11299
50	Business and Com. Tech.	8080	16274	18059
51	Data Processing Technologies	721	960	1341
52	Health Services & Para. Tech.	3694	6818	6279
53	Mechanical Science Tech.	3010	4629	4666
54	Natural Science Tech.	1006	2857	2814
55	Public Service Related Tech.	1883	4223	3458

Source NYSED: Postsecondary Information Systems/ HEDS and Information Center on Education

Table 4
National Occupational Data
Grouped By 2 Digit HEGIS
Categories 1970&1978
Technologist Level

HEGIS Code	Program Area	1970 % Total Occ.	1978 % Total Occ.	Percentage Change
50	Business & Commerce Tech.	23.61	23.78	+0.1
51	Data Processing Tech.	0.63	0.78	+23.8
52	Health Services & Paramed. Tech.	0.43	0.65	+51.2
53	Mechanical & Eng. Tech.	14.14	14.14	0.0
54	Natural Science Tech.	0.70	0.52	-25.7
55	Public Service Related Tech.	1.14	1.19	+ 4.4
	Operative Categories	35.38	33.03	

Source: The U. S. Bureau of Labor Statistics
National Industry - Occupation Matrix for 1970 and 1978

Table 3
National Occupational Data
Grouped By 2 Digit HEGIS
Categories 1970&1978

HEGIS Code	Program Area	1970 & Total Occ.	1978 % Total Occ.	Percentage Change
01	Agriculture & Nat. Resources	2.26	1.66	-25.5
02	Architecture & Envir. Design	0.80	0.80	0.0
03	Area Studies	-	-	-
04	Biological Sciences	0.04	0.05	+25.0
05	Business Management	9.64	11.24	+16.6
06	Communications	0.35	0.50	+42.9
07	Computer & Info. Science	0.35	0.46	+31.4
08	Education	4.53	4.46	- 1.5
09	Engineering	1.42	1.25	-11.9
10	Fine and Applied Arts	0.46	0.61	+32.6
11	Foreign Languages	-	-	-
12	Health Professions	1.77	2.03	+14.7
13	Home Economics	0.01	0.01	0.0
14	Law	0.40	0.54	+35.0
15	Letters	-	-	-
16	Library Science	0.16	0.17	+ 6.3
17	Mathematics	0.05	0.04	-20.0
19	Physical Sciences	0.21	0.20	- 4.8
20	Psychology	0.04	0.12	+200.0
21	Public Affairs	0.76	0.85	+11.8
22	Social Sciences	0.41	0.64	+56.1
23	Theology	0.31	0.28	- 9.7
49	Interdisciplinary Studies	-	-	-

Source: The U. S. Bureau of Labor Statistics
National Industry - Occupational Matrix for 1970 and 1978

Table 5
Degrees Awarded Bachelors and Above
New York State 1970-71, 1977-78 and 1978-79
As Percentages, Percentage Change and
Occupation Change

		Percentage Of Degrees 1970-71	Percentage Of Degrees 1977-78	% Change	Percentage Of Degrees 1979-80	Change	Occ. % Changed
01	Agriculture & Nat. Resources	.60	.68	+13.0	.61	+1.7	-25.5
02	Architecture & Env. Design	.76	1.01	+33.0	1.03	+35.5	0.0
03	Area Studies **	.33	.40	+21.2	.33	-	-
04	Biological Science	3.99	4.98	+24.8	4.60	+15.3	+25.0
05	Business Management	10.34	14.66	+41.8	17.56	+69.8	+16.6
06	Communications **	.68	2.10	+208.8	2.53	+272.1	+42.9
07	Computer & Info. Science *	.39	.99	+153.8	1.48	+274.4	+31.4
08	Education	20.94	16.45	-16.7	14.09	-41.5	-1.5
09	Engineering	6.17	5.48	-11.2	6.13	-6.5	-11.9
10	Fine & Applied Arts	4.27	4.99	+16.9	5.09	+19.2	+32.6
11	Foreign Languages	3.16	1.68	-46.8	1.52	-51.9	-
12	Health Professions	2.74	6.63	+142.0	7.37	+182.1	+14.7
13	Home Economics	.63	1.24	+96.8	1.10	+74.6	0.0
14	Law	.39	.46	+17.9	.43	+10.3	+35.0
15	Letters	9.88	5.48	-44.5	4.97	-49.7	-
16	Library	1.10	.68	-38.2	.56	-49.1	+6.3
17	Mathematics	3.41	1.60	-53.1	1.31	-61.6	-20.0
19	Physical Science	3.25	2.43	-25.2	2.24	-31.1	-4.8
20	Psychology	5.30	5.53	+4.3	5.21	-1.7	+200.0
21	Public Affairs **	1.73	4.60	+165.9	4.91	+183.8	+11.8
22	Social Sciences	17.32	13.32	-23.1	12.32	-28.9	+56.1
23	Theology	0.46	.23	-50.0	.27	-41.3	-9.7
49	Interdisciplinary Studies	1.49	4.45	+198.7	4.31	+189.3	-

* Degrees awarded from 1964-65

** Degrees awarded from 1969-70

Table 6
Trends in Degree Production and
Occupational Change Between
1970 and 1978
Programs.

Occupations	+	-
+	[expanding programs / expanding occupations] Biological Science Business Management Communications Computer & Inf. Sc. Fine & Applied Arts Health Professions Law Public Affairs Psych. (1977-78)	Library Science Psychology (1979-80) Social Science
-	Home Economics Agriculture and Nat. Resources	Architecture and Environmental Design Engineering Education Mathematics Physical Sciences Theology [contracting occupations / contracting programs]

that have a generic function.

There are degrees awarded at the higher levels (bachelors and above) in nineteen areas for which there is corresponding occupation data. It will be seen that there are eight areas which are expanding in degree production and also in occupation. These are all areas which correspond with the known reality that the economy is moving in a service orientation.

The Areas are:

Biological Science	Fine and Applied Arts
Business Management	Health Professions
Communications	Law
Computer and Information Science	Public Affairs

There are five areas where there is contraction of programs and of occupations. Demographic, cultural and economic factors are likely to be involved in accounting for the declines.

They are:

Engineering	Physical Science
Education	Theology
Mathematics	

The remaining programs have contradictory findings and may be affected by particular factors including ones specific to New York State.

They are:

Agricultural and Natural Resources	Library Science
Architecture and Environmental Design	Psychology
Home Economics	Social Science

Discussion

The parameters of this paper preclude a full discussion of the data presented here. However, some interesting features are worthy of comment. Two sets of occupational data were used, and it should be noted only eight years apart and even in that relatively short time-frame considerable percentage change is in evidence. This is particularly the case with the growing programs/occupations, where there is considerable gain on both variables. The contracting programs/occupations show a smaller decline generally in occupations, with the exception of mathematics (which may be due to a flight to Computer Science), never the less, degrees production contracts accordingly.

I had reasonably assumed a lag effect might be present between occupation change and degree production. I therefore included the latest year of degree data available in making the tabulations. The broad trend is matched however, year for year and the "lagged" year of degree data serves more to clarify the contradictory relationships. Agriculture occupationally, is shown in decline but the degree data shows growth to 1977-78 but moves into decline in the lag period. It may further be suggested that agriculture has contracted its labor force, while increasing production through the use of superior technology. It is possible that the demand for education was increased. Similarly, with Architecture and Environmental Design, the lag period has stability in degree production, it is possible that there was a hump in occupation growth between the two labor surveys.

Library Science may have in it a credential effect (the State raised its standards) thus creating demand for education at the turn of the seventies in New York State. In the case of degree production within the

psychology category there was growth in both degrees and occupations, but a decline in degrees on the lag year of 1979-80. Moreover, the higher degrees continued to grow. There has been a marked decline in bachelor's degrees through the period as also the case with Social Sciences, though in the latter higher degrees declined as well. Both occupations have made a rapid advance in minimum qualifications. It is also probably true that students have moved away from both these areas at the bachelor's level because of changes in attitudes culturally towards social science study.

Associate degrees were introduced in New York State and awarded from 1970-71 onwards, the same year from which is drawn the occupation data of this study. Some caution in interpretation is therefore warranted. Natural Science Technologies is the only one though, that does not correspond with the occupation trend. It is also worthy of comment that the large numbers of associate degrees produced in the short time frame of a decade would seem to be related to the size of the occupation ratio.

The data suggests that there is a close relationship between changes in degree production and changes in occupation size. It should, of course, be realized that developing a forecasting model for a particular situation would require the inclusion of a number of variables not considered here.

At the more theoretical level the data suggests that higher education is operating very much with a sense of the wider environment. Recent research on economic forecasting (Lahiri, 1982) suggests that the non-expert can do a good job when compared with the expert. Students may be similarly sensitive. It seems at the aggregate level students anticipate the reality of the world of work and choose accordingly.

Conclusions

This study has answered the question in the affirmative of whether there is a relationship between degree production and occupational change. Planners would do well to maintain awareness of occupational trends. Further research on the strength of the relationship between educational programs and changes in occupations is indicated. Gluts and shortages could also profitably be considered. Clearly the educational enterprise adjusts to its environment. A better knowledge of how it works would at the least provide the means for improving information dissemination and anticipation on the part of planners.

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MEASURING THE IMPACT OF PROPOSED FINANCIAL AID CUTS: THE PERFECT STUDY IS ALWAYS TOO LATE

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INTRODUCTION

In the fall of 1981, the Reagan administration proposed a series of major reductions in federal financial aid programs. Prior to that time, short-range planning studies at Ithaca College had focused on estimating the effects on enrollment of demographic changes, shifts in students' interests, and changing requirements for entry into the professions; it had been assumed that the effects of the financial-need variable would remain constant in the short term. Ability to pay has never been a factor in admissions decisions at Ithaca. Although the College has not been able to meet all financial need, opportunities for middle-income and lower-income students to attend Ithaca College increased between 1976 and 1981 as a result of three factors. A deliberate decision to keep increases in tuition low made the College more affordable in comparison to other independent colleges. Successful development efforts increased the College's scholarship resources; in partnership with New York State and the Federal government, Ithaca College was able to provide better financial aid packages to its students. Most important, the Guaranteed Student Loan program allowed students to borrow money at a reasonable cost.

Since the Reagan administration's proposals implied a radical change in the federal government's role in financing higher education, it was apparent that an assessment of the probable effects of these proposals was essential before further decisions could be made regarding enrollment goals, marketing and recruitment initiatives, tuition and fee policies, and fund-raising priorities. This paper describes the first stage of a series of

studies designed to assess the effects of reductions in federal financial aid programs.

THE STUDIES

The first study to be described was presented to the Planning Group at Ithaca College (President, Executive Officers, Director of Institutional Research and Planning, Affirmative Action Officer, Executive Assistant to the President) in December of 1981. Its objective was to provide information on financial need which would be helpful in evaluating a marketing-recruitment proposal submitted by the Director of Admissions. (This analysis will be referred to as "The Marketing Study.") The second study, presented to the Planning Group in March of 1982, described a general model for estimating the effects of proposed cuts in federal financial-aid programs and illustrated the use of this model by comparing the actual distribution of financial aid packages to a freshman class (first-time, full-time, fall 1980) with an estimated distribution of financial aid packages to the first-time, full-time freshman class projected to enroll in fall, 1983. (This study will be referred to as "The Aid Model".)

As the title of this paper suggests, these analyses are being reported at the NEAIR Conference in hopes that they will be helpful illustrations of applied research studies done under the following conditions: (a) an unanticipated event has occurred which is likely to alter the assumptions used in short-range planning at the institution; (b) assessing the full effects of this event requires extensive, detailed data which are not readily available; (c) senior officers must make major policy decisions within specified time periods, and the information developed by the Institutional Research and Planning Office must be presented before these deadlines; (d) some individuals involved in the decision-making process are unfamiliar with the accepted journal format for reporting institutuonal research studies; a presentation style must be developed which will aid them in assimilating complex information rapidly.

Examples of the conventional research reporting format are numerous, while illustrations of presentations designed for a wider audience are rare. The studies reported in this paper, therefore, will be presented in the same format which was developed for the Ithaca College Planning Group. For reasons of confidentiality and brevity, much of the original

information has been omitted. It is not anticipated that an institutional research and planning officer at another institution will formulate the same questions, collect the same data, or use the same presentation format; this description of the work of the Ithaca College institutional research and planning staff is being reported as an example of one kind of response which can be made to an unanticipated event which affects short-term planning assumptions.

THE MARKETING STUDY

Date of Presentation to the Planning Group: December 16, 1981

Objective: Provide information for evaluating the proposed admissions/ publications package for entering classes, 1983 and 1984.

Decision deadline: Christmas

Questions to be addressed:

A. How many students request financial aid when they apply to Ithaca College and how many do not?

B. Considering applicants (1) who do not request financial aid, and (2) who are rejected by Ithaca College; how is this group distributed across SAT categories?

C. What percent of our freshmen class apply to and are accepted at other colleges?

D. By specific academic program, who are our major competitors?

E. Many of the students we admit are also admitted by another college. When we compare "matriculants" (those who choose to enroll at Ithaca College) with "cancels" (those who choose to enroll at a competing college), what percent of each group rank costs and financial aid as major reasons for their choice of college? Do these percentages vary among specific academic programs at Ithaca College?

Conclusions:[1]

A. For the College as a whole, about half of our freshman applicants in 1980 requested financial aid and half did not. These percentages varied considerably by program: 64% of the applicants to Program Group #1 asked for aid, while only 25% of applicants to Program Group #2A asked for aid. For the College as a whole, there is no difference in the percent of "Cancels"

[1]These conclusions were reviewed and discussed by the Director of Institutional Research and Planning as each table was presented to the Planning Group.

(students we admitted who did not enroll) and "Matrics" (students who did enroll at Ithaca College), insofar as requests for financial aid are concerned. It does appear, though, that in some programs financial need may already be a factor in the decision to enroll at Ithaca College. SEE TABLE 1.

B. If cuts in federal financial aid programs keep needy students from attending Ithaca College in the future, we may have to choose between a smaller freshman class or a less academically capable freshman class. Of the students we rejected who did not ask for aid in 1980, 88% had SAT scores which were lower than the Ithaca College median score. SEE TABLE 2.

C. Of the students who enrolled as freshmen in 1980, about 4 out of 5 applied to and were accepted at another college. Since our programs are diverse, we tend to have a different group of major competitors for each program. In the case of some of our smaller programs, specific major competitors do not even appear on our all-college list of major competitors. Only one of the major competitors identified in this study is an independent institution in New York State which will be affected comparably by changes in both Federal and New York State financial aid programs. For most programs, we are competing with public and independent institutions. SEE TABLE 3.

D. We were able to find some groups of students who were accepted at Ithaca College and another college and match the responses of those who came to Ithaca College ("Matrics" who responded to our Student Orientation Questionnaire) with those who chose the other college ("Cancels" who completed our Cancel Questionnaire). These are small groups and may not be fully representative of all the students who were accepted by us and by a specific competitor. It appears, though, that in some cases we have marketed Ithaca College successfully but have lost students to competitors because we were too expensive or because our financial aid packages were insufficient. In other cases, costs and financial aid did not appear to be the significant factor in the decision not to enroll at Ithaca College. Given the prospect of major cuts in financial aid, we need to ask whether the same marketing approach is appropriate for all programs. SEE TABLE 4.

THE AID MODEL

Objective: Estimate the impact of proposed federal financial aid cuts on the freshman class at Ithaca College in 1983-84, based on an analysis of financial aid patterns for freshmen in 1980-81. (EOP-HEOP freshmen and

TABLE 1. Admissions Cycle, Freshmen, Fall 1980: Requests for Financial Aid.

Group		All-College	Program Group #1	Program Group #2A	Program Group #3
Applicants:		100%	100%	100%	100%
Financial Aid:	No	53%	64%	25%	59%
	Yes	47%	36%	75%	41%
Mean Need		$N,NNN	$N,NNN	$N,NNN	$N,NNN
Rejects:		100%	100%	100%	100%
Financial Aid:	No	53%	69%	26%	63%
	Yes	47%	31%	74%	37%
Mean Need		$N,NNN	$N,NNN	$N,NNN	$N,NNN
Accepts:		100%	100%	100%	100%
Financial Aid:	No	54%	62%	24%	57%
	Yes	46%	38%	76%	43%
Mean Need		$N,NNN	$N,NNN	$N,NNN	$N,NNN
Cancels (Nonmatrics):		100%	100%	100%	100%
Financial Aid:	No	53%	62%	26%	54%
	Yes	47%	38%	74%	46%
Mean Need		$N,NNN	$N,NNN	$N,NNN	$N,NNN
Matrics:		100%	100%	100%	100%
Financial Aid:	No	54%	62%	22%	62%
	Yes	46%	38%	78%	38%
Mean Need		$N,NNN	$N,NNN	$N,NNN	$N,NNN

TABLE 2. Ratings of Combined SAT Scores for Applicants Who Were Rejected by Ithaca College and Who Did Not Request Financial Aid.

Program Group	Total	Above Average	Average	Below Average
Total	100%	3%	9%	88%
#1	100%	2%	6%	92%
#2A	100%	9%	26%	65%
#2B	100%	0%	0%	100%
#3	100%	0%	8%	92%
#4	100%	8%	14%	78%
#5	100%	0%	0%	100%
#6	100%	10%	15%	75%

TABLE 3. Competitive Status: Full-time Freshmen, Fall, 1980

Category	Total	Program Group #1A	#1B	#2A	#2B	#3	#4	#5	#6
All matriculants	100%	100%	100%	100%	100%	100%	100%	100%	100%
No competition	17%	13%	23%	16%	15%	18%	18%	18%	21%
Applied only at Ithaca College	(11%)	(5%)	(19%)	(16%)	(15%)	(8%)	(15%)	(11%)	(14%)
Accepted only at Ithaca Coll	(6%)	(8%)	(4%)	(0%)	(0%)	(10%)	(3%)	(7%)	(7%)
Competition	83%	87%	77%	84%	85%	82%	82%	82%	79%

TABLE 4. Competitive Status: Selected Competitors by Specific Program[1]

Item	Program Group #2A Select Competitors School 1	School 3	School 1	Program Group #3 Select Competitors School 2	School 3	School 4
Number						
Matrics at IC	n	n	n	n	n	n
Cancels at IC	n	n	n	n	n	n
Comb. SAT Score ($\overline{X}$)						
Matrics at IC	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$
Cancels at IC	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$	$\overline{X}$
% Req. Fin. Aid at IC						
Matrics	75%	86%	27%	38%	0%	75%
Cancels at IC	83%	67%	56%	33%	0%	33%
Mean Need at IC						
Matrics at IC	$N,NNN	$N,NNN	$N,NNN	$N,NNN	$ 00	$N,NNN
Cancels at IC	$N,NNN	$N,NNN	$N,NNN	$N,NNN	$ 0	$N,NNN
Costs Major Consideration						
Cancel Group Only	50-74%	100%	<25%	<25%	25-49%	25-49%

[1]Competitors: School 1-out of state private U.; School 2-instate private U.; School 3-instate public U.; School 4-out of state public U.; School 5-...

recipients of Veterans Benefits, Social Security Benefits and Employee Dependent Tuition Remissions have been excluded from this analysis.)

Model: This model will be used for future studies; specific assumptions about cuts in federal programs will be changed to reflect actual legislation.

A. "Cost of education" is the cost of education to the student (tuition, room, board, books, travel); the estimate used is the typical package figure which our Financial Aid Office develops in order to assess financial need.

B. It is assumed that the cost of education is met by: (1) parental contributions; (2) student contributions (earnings during the summer and the school year); (3) New York State financial aid programs; (4) Federal financial aid programs; (5) Ithaca College scholarships.

C. In comparing resources available in 1980-81 with resources likely to be available in 1983-84, it is assumed that:

(1) Parents are able to pay the same percentage of the cost of education. In this model, the Guaranteed Student Loan Program is considered a resource for the parent. In 80-81, the parent could borrow up to $2,500 per year, regardless of whether the student could demonstrate "unmet need." This model assumes that in 1983-84, the parent will be able to borrow only against "unmet need." If an income cap is imposed for the GSL program (e.g., exclusion of parents making more than $30,000, regardless of the "unmet need" factor), then this model will not be useful.

(2) Students are able to pay the same percentage of the cost of education. This model assumes that both the College Work-Study Program and the Ithaca College student payroll are resources for the student. It is assumed that the College Work-Study Program will not be cut substantially, and that the Ithaca College Student Payroll will meet the same percentage of the student's contribution in 1983-84 as in 1980-81.

(3) New York State financial aid programs will meet the same percentage of the cost of education.

(4) Pell Grant (BEOG) will be cut 40%.

(5) Supplemental Educational Opportunity Grants (SEOG) will be cut 100%.

(6) National Direct Student Loans will be cut 100% insofar as freshmen in 1983-84 are concerned. This assumption will change for other classes. The underlying assumption is that we will be hard-pressed to maintain NDSL

commitments to upperclassmen in 1983-84; it is unlikely that money will be available for freshmen.

(7) Ithaca College scholarships will meet the same percentage of the cost of education in 1983-84.

Illustration of the Model: Freshman Class, 1980-81, Compared with Freshman Class, 1983-84

(Note: The "Total Cost of Education" equals number of matriculants X Typical Package. In 1980-81, cost of education equaled 1297 matriculants times $7,680 package. For illustration only, we are assuming the same number of matriculants and a typical package cost of $10,000 in 1983-84.)

	80-81	83-84
Total cost of education	100%	100%
Parental and student contributions (includes GSL, CWS, IC wages)	87%	87%
All other aid sources	13%	8%
(NYS)	(3%)	(3%)
(IC scholarships)	(4%)	(4%)
(BEOG, SEOG, NDSL)	(6%)	(1%)
Shortfall resulting from federal cuts	5%	

Distribution of Aid to Freshmen in 1980-81

All freshmen	100%
Not receiving NY S aid, IC scholarship, BEOG, SEOG or NDSL	65%
Receiving one or more of these aid packages: NYS aid, IC Scholarship, SEOG, BEOG, or NDSL.	35%

ABOUT 1 IN 3 FRESHMEN IN 1980-81 RECEIVED AID FROM NEW YORK STATE, IC SCHOLARSHIPS, BEOG, SEOG OR NDSL.

Estimated Effects of Federal Cuts in 1983-84, Based on Patterns of Aid in 1980-81 and Assumptions Previously Outlined

All freshmen	100%
Not receiving NYS aid, IC scholarship, BEOG, SEOG, or NDSL	65%
Receiving NYS aid only	4%
Receiving only IC scholarship, or receiving only IC scholarship and NYS aid	5%
Affected by cuts in BEOG, SEOG, or NDSL	26%

(Range in percent affected: program A - 46%; program Z - 18%)

ABOUT 1 IN 4 FRESHMEN COLLEGE-WIDE ARE LIKELY TO BE AFFECTED BY CUTS IN BEOG, SEOG OR NDSL. THE PERCENTAGE AFFECTED VARIES WIDELY BY SCHOOL.

FOR THESE FRESHMEN, BEOG, SEOG, AND NDSL MONEYS ACCOUNTED FOR ABOUT 23% OF THE COST OF EDUCATION IN 1980-81.

AFTER THE ASSUMED CUTS, THESE FRESHMEN WILL BE SHORT, ON THE AVERAGE, ABOUT 19% OF THE COST OF EDUCATION IN 1983-84.

Offsetting Federal Cuts: Estimated Cost to Ithaca College

If we attempt to offset these estimated federal cuts with Ithaca College scholarship dollars, scholarship money for freshmen would have to increase from 4% of the "cost of education" for all freshmen (number of matriculants X package cost) to 9% of the "cost of education" for all freshmen.

Another way to look at this problem is to consider Ithaca College scholarship moneys and Federal funds as "discounts" against the cost of education. Because financial need varies widely by specific academic program at Ithaca College, the "discounts" account for a much higher percentage of the cost of education in some programs than they do in others. The following table details the estimated effects of cuts in BEOG, SEOG, and NDSL using the "discount" model. Note that while the all-college "discount" for freshmen in 1980-81 was 10%, the range by program was 7% to 19%.

TABLE 5: Financial Aid as "Discount": All-College and Specific Programs
"Discounts" on the Cost of Education for All Freshmen

	Actual 80-81			Estimated 83-84		
Unit	IC Schol.	BEOG, SEOG NDSL	Total	IC Schol.	BEOG	Total
All-College	4%	6%	10%	4%	1%	5%
#6	9%	10%	19%	9%	2%	11%
#5	7%	10%	17%	7%	2%	9%
#2	6%	9%	15%	6%	1%	7%
#4	5%	8%	13%	5%	1%	6%
#3	4%	5%	9%	4%	1%	5%
#1	3%	4%	7%	3%	1%	4%

SUMMARY

These analyses were part of the planning process at Ithaca College. They were not the definitive factor in the formulation of any specific decision, nor should they have been. When college administrators discuss factors which contribute to good decision-making, the typical researcher argues the merits of quantitative data. But even the most forceful proponents of the value of institutional research studies assume that the topic under consideration is "researchable," that relevant data exist, and that adequate time is available to do a comprehensive study. At the typical college, however, the institutional researcher is frequently a participant in a decision-making process where the traditional assumptions cannot be met. It is on these occasions that the institutional researcher's professional judgment is tested as he or she addresses the following questions:

A. When does one inform the President that the careful planning studies which have been completed by the Office of Institutional Research & Planning are now irrelevant -- or, perhaps, actually detrimental to good decision-making -- because an unanticipated change in a major variable must be considered?

B. If one cannot do "the perfect study," when should one do nothing, and admit that the techniques of institutional research are not useful in addressing the particular problem facing the institution?

C. When should one do a limited or partial study of a complex issue?

D. If one does a limited study, how does he or she communicate judgments about "scope," "validity," and "reliability" to those who are unfamiliar with the researcher's definitions of those terms?

As this paper demonstrates, the institutional research staff at Ithaca College chose to do certain analyses related to the topic of federal financial aid cuts. The major factor in the decision to do these studies was the context in which the information would be disseminated. The Planning Group is small, the members know each other well and have worked together for a long period of time and they share an extensive knowledge of the College. The Director of Institutional Research and Planning explained the analyses to the group; each major point was discussed as it was presented. Since the group included people with current knowledge of legislative initiatives at the Federal level, the researcher's assumptions

concerning federal aid cuts were carefully examined. As the group had worked together closely on many other occasions, the tone of the working session was frank and informal. Most important, the Director of Institutional Research & Planning was confident that a mutual understanding had been established concerning the proper weight to be given to various kinds of information. Under these conditions, limited studies of complex issues help senior officers of a college to make short-range policy decisions under time pressures. In other situations, the likelihood that limited studies will be used inappropriately may be quite high. It is, therefore, the responsibility of the researcher to evaluate carefully the kind of audience to which such studies are addressed and the methods by which they will be disseminated.

MICROCOMPUTERS IN INSTITUTIONAL RESEARCH

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Word processors are lacking from many Institutional Research (IR) offices and computer terminals are conspicuously missing from others, yet it's nearly guaranteed that the IR office of the future will have its own microcomputer. These desk-top computers, some smaller than a Selectric typewriter, have taken the businesss world by storm, and have become an indispensable tool for accomplishing decision-making in increasing numbers of organizations. This paper introduces the novice to the world of microcomputers and provides useful, up-to-date information for the initiated. Three issues are addressed in the paper:

- Uses of microcomputers in IR
- Considerations in purchasing a microcomputer
- Recent microcomputer developments and future trends

A BYTE (BIT) OF COMPUTER BACKGROUND

In 450 B.C. the Chinese invented the abacus, humankind's first calculating machine, still in use today in many parts of the world. Two thousand years later, 1823, the Frenchman Babbage, conceived of the first automatic calculating machine, the analytic engine. More than a century later, in 1946, the twentieth century witnessed the first electronic computer. The ENIAC required over 5,000 square feet of floor space, was designed with 18,000 vacuum tubes, and had 1,000 words of memory. Technological advancement has proceeded at a rapid pace since then. With the advent of the transistor (1948) and integrated circuitry (1961), the road was paved for development of the microprocessor. Originally considered a hobbyist toy, the microcomputer industry is now a multi-billion dollar industry. In contrast to the ENIAC, the microprocessor, developed with large scale integration (LSI) technology, is contained within a 1" x 2" x 1/4" silicon chip and typically has 64,000 (64K) words (bytes) of memory. The creation of VisiCalc spurred the industry and over 150 companies world-wide manufacture microcomputers.

USES OF THE MICROCOMPUTER IN IR

The author has defined six primary areas where the microcomputer can greatly aid the institutional researcher:

- modeling
- graphics
- word processing
- communications
- databases
- statistical analysis

Modeling

The information gathering process in IR provides data for the planning and decision-making functions of the university. Modeling is an important tool for the planner. A model is a hypothetical set of relationships used to forecast some future state. IR generally employs financial forecasting models which supplement the institutional budget process. Some readers may be familiar with the EFPM[1] and IFPS[2] modeling systems which reside on mainframe computers. Both systems can be costly to use and IFPS requires considerable computer expertise. The microcomputer has added a new dimension to modeling. The software is simple to use, even by the novice, and powerful outcomes can be obtained at the touch of a key. VisiCalc, SuperCalc, DSS/F, and MBA are some of the more well known microcomputer modeling systems. The first two systems provide electronic spreadsheets with 63 columns and 252 rows. Labels, constants, and formulas fill this matrix and any cell in the matrix can be made conditional upon cells above and to the left. A powerful repeat command eases formula generation. Defining columns as time periods, and rows as budget line items, the modeler can easily modify inflation, growth rates, and other assumptions to forecast future budgets. VictorCalc is a three-dimensional modeling system, similar to VisiCalc, but provides the capacity to add university department or some other grouping variable as a third dimension. Any two dimensions can be displayed simultaneously. These programs do not require programming knowledge and typically can be mastered in 3 hours. The primary limitations of VisiCalc types of

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[1] Educom

[2] Execucom

modeling software are matrix size, minimal report formatting, lack of transferability of data to other software packages (e.g. graphics), and lack of a facility for feedback loops in models.

DSS/F and MBA combine modeling, graphics, and report generation into one package. While more flexible and powerful than VisiCalc or SuperCalc, these systems require considerable computer expertise and also have restricted model sizes. Many planning and IR offices spend up to $50,000 annually on modeling activities, so a microcomputer at $4000 and VisiCalc at $250 can provide enormous cost savings to an institution.

Graphics

Graphs and charts for various presentations and reports, and an annual fact book filled with bar charts and pie charts are often produced by the IR office. If you have experienced the production of slides and transparencies by hand (which often have to be redone when data are updated) then you can appreciate the time saved by having a computer assume this task. The microcomputer is outstanding in its graphics capability. An interactive graphics package with graphics terminals and a plotter cost approximately $50,000 on a large computer. Powerful graphics capability is available on a microcomputer with the addition of a software package at $250 and a dot matrix printer at $500, or a plotter at $2,000.

Exceptional and finely detailed graphs can be generated with the microcomputer. In addition to a graphics equipped machine, one needs graphics software, a plotter (or a printer), a high quality monitor, and a shot of imagination. Two types of microcomputer software packages are available: screen graphics and plotter graphics (sometimes combined into one package).

The most common graphics packages are screen graphics which provide for screen transfer to a dot matrix printer. These systems tend to be menu driven and easy to use for creating bar charts, line graphs, and pie charts. The screen can be photographed to make slides, or can be electronically transferred by recently developed processes to transparencies or other hard-copy media.

Microcomputers tend to differ greatly in screen resolution from 200 by 200 pixels (dots) to 1,000 by 1,000 pixels. Some microcomputers are equipped with efficient bit-mapped graphics, while others are only capable of character graphics. A good quality black and white or color

monitor is required for graphics display. Since a TV cannot produce a high resolution display, an RBG color monitor (cost $1,000) is suggested for graphics. For the screen graphic to be transferred to the printer, the printer must also have a graphics chip (usually installed by the dealer).

A second type of graphics package drives a flatbed color pen plotter. Since the lines drawn are continutous (rather than composed of dots), a very high quality product is obtained. The microcomputer can be directly linked to the flatbed plotter, or data can be transferred over phone lines to the plotter controlled by a central computer. Many very promising developments in microcomputer graphics are underway at this time.

Word Processing

Word processing (WP) has revolutionized the print industry and has made the typewriter obsolete. Since screen editors with word processing capabilities tend to consume substantial system resources on a large computer, many colleges have restricted word processing on the central computer and the independent WP system has become rather common. WP systems with letter quality printers cost over $10,000. Though microcomputer WP systems, which became available a few years ago, lack some of the power and features of the independent WP system, microcomputers have the advantage of computational capability.

An excellent CP/M based WP system is WordStar. WordStar combined with a sorting package, a merging facility, and a mail label and listing program is a sophisticated system. It supports most of the well known brands of dot matrix or letter quality printers. A dot matrix printer is fast, but can not be used for final copy. The Diablo and Spinwriter printers cost around $2,000 and print 60 characters per second while the new $500 letter quality printers print only 10 characters per second.

The advantages of using the microcomputer for word processing are cost and computational capability. A file created in one program, for example, SuperCalc, can be processed by a word processing program, for example, WordStar. Micro-based WP does not offer all of the power and features of independent WP systems since microcomputers are rather slow and their keyboards lack the special editing and funtion keys found on independent WP systems.

Communications

More new products and systems have been developed for communications from microcomputers than any other application. The microcomputer's real power will be realized when it is linked with other users both locally and on other campuses. Communications can be used for:

- simple terminal emulation - linking to a mainframe
- file transfer to another computer
- database access
- distributed data processing
- local area networks
- electronic mail
- access to nationwide networks of information
- typesetting
- computer conferencing

Without a doubt, one of the most exciting applications of communications is electronic mail networks. Bitnet and Edumail are two such networks available to universities which can be accessed from a terminal or microcomputer. Electronic mail provides editors, file handling, and management software for the transfer of information over high speed lines across the nation. Network members must install special softare on their central computer and rent a dedicated phone line.

The two forms of communications are direct and indirect. A direct link is established when a microcomputer is connected by cable into some form of network either linked to a larger computer elsewhere, or to microcomputers using a Winchester hard disk and network software such as Omninet. There are few proven network test sites in the country, and microcomputer network systems, purported to support 4 to 16 microcomputers, have been tested even less.

Indirect communications are established using the telephone system. The microcomputer must be equipped with communications hardware and software and a modem or an accoustic coupler is required. The microcomputer can call any computer or can link into worldwide networks through Tymenet or Telenet. There are four levels of software that can be purchased for communications: teletype or "dumb" terminal emulation; "smart" terminal emulation (e.g. 3270, VT100); terminal emulation with file transfer and error checking capability; and packages that can

communicate with a mainframe operating system. In addition to using the microcomputer as a computer terminal for receiving information, more sosphisticated communication software allows information to be "downloaded" to the the microcomputer disk system and "uploaded" (sent) to another computer.

Communication over telephone lines is slow and unreliable unless the lines are dedicated to data communications or designed with optical fiber. The greatest drawback to microcomputer communications at this time is that most operating systems are single task systems; while communicating, the microcomputer needs to be dedicated to this purpose. Communication from a microcomputer is more practical when a multitask operating systems, such as MP/M, is installed.

Databases

Researchers need access to large amounts of information. The microcomputer can play a significant role in data access: retrieval of large databases from another computer; preparation of databases to be sent to another computer; management of small databases residing on the microcomputer disks. For accessing information, the microcomputer can be used like a terminal; in addition, data can be retrieved on disk and analyzed or manipulated at a later time. For example, mail lists can be downloaded to the microcomputer for printing personalized letters and mail labels.

When the microcomputer is used for data preparation, a great deal of "on-line" time can be saved on the remote computer. Data can be prepared, edited and scored on the microcomputer and then sent in a single transmission to a mainframe. In an environment where data is entered interactively at a significantt cost, the microcomputer offers a practical alternative.

Small databases can be created and manipulated directly on the microcomputer; database languages have been developed for this purpose, for example, DBMaster and DBaseII. Many small colleges have put their entire fund raising, alumni, and other datasets on a microcomputer. With the addition of a Winchester hard disk (capacity 5 to 50 million bytes) fairly large databases can be stored. The primary disadvantage of microcomputer database systems is speed especially for searching sorting operations. The newly announced Motorola 68000 microprocessor (a 16/32

bit chip) is more efficient for database manipulation because the data word is larger and the CPU (Central Processing Unit) can directly address millions of words of memory.

A very useful application of the microcomputer is the preparation of annual reports, such as a fact book. Data can be stored in a database, new figures can be computed yearly, text can be edited with the word processor, graphs can be updated, and the final text can be transferred to typesetting equipment over communication lines.

Statistical Analysis

Statistical software for microcomputers is limited for two reasons: general statistical products do not have significant appeal in the business world; and the capacity of memory on the microcomputer is insufficient for the programming of sophisticated statistical routines. Because floating point numbers require 5 bytes of storage on an 8-bit microcomputer, a regression problem with 50 variables requires 37.5K words of memory. The 16-bit microcomputer can directly address more memory, but is also restricted to an 8-bit data word. Microcomputers offer statistical software for simple descriptive statistics, frequency tables, cross tabulation, chi square tests, t-tests, and simple anova, correlation, and regression. The 68000 microcomputer has distinct advantages for statistical analysis, but at the present time little software has been developed for this system. It is anticipated that statistical products will be developed by researchers in academic settings, though most likely these will not be available through commercial markets. There are some statistical packages available for CP/M microcomputers. VisiPlot/Trend, a combined regression and graphics package is available on the Apple for trend and time-series analysis and there is also a microcomputer version of SPSS running under CP/M.

CONSIDERATIONS IN PURCHASING A MICROCOMPUTER

Microprocessors can be classified into four basic chips:

- 6502 home computers with proprietary operating systems
- Z80 8-bit desktop computers with CP/M
- 8086 16-bit desktop computers with CP/M-86 or MS-DOS
- 68000 16/32-bit computers with UNIX

The Z80 microcomputer, running the CP/M operating system, has become a standard. More software runs under CP/M than any other microcomputer operating system. CP/M-86 and MS-DOS (the operating system on the IBM PC) are competing to become the standard for 16-bit microcomputers. Some of the newer microcomputer systems, such as DEC's Rainbow 100, have the capability of switching between 8-bit and 16-bit programs. The Motorola 68000 microprocessor with 16-bit architecture and a 32-bit register can directly address millions of bytes of memory and is a very powerful system. The UNIX operating system which operates on larger computers, such as the VAX, has been redesigned for the 68000.

Within any class of microcomputers, the primary differences are found in the packaging and in the proprietary products offered. Microcomputers are similar in that memory is divided into RAM (random access memory) and ROM (read only memory). The operating system, BASIC interpreter, and system utilities reside in ROM. RAM is best compared to core memory on a mainframe. In terms of design, some microcomputers are totally self-contained, others have detached components, and some are handheld or portable. Screen displays and keyboards tend to be radically different from one system to another. Less expensive microcomputers can display only 40 characters on the screen and have few extra keys on the keyboard; better microcomputers display 80 to 150 characters, and are equipped with numeric keypads, function keys, cursor control keys and other special keys (e.g. a HELP key). Most desk top microcomputers come equipped with two disk drives. Double sided double density disks have more tracks and greater storage capacity. The monitor is usually purchased as an extra, as are plotters, printers, and other peripherals. Software designed to operate under a specific operating system <u>could</u> execute on any other computer with the same CPU if the disk formats between systems were compatabile. Unfortunately, at present, there is little exchangeability of software between systems. Home computers with proprietary operating systems have no software interchange.

There are three methods for purchasing microcomputers: mail order, retail outlets, and directly from the manufacturer. Universities are granted a 15% discount from retailers even on a single purchase. Manufacturers have been rumored to provide 30 to 50 percent discounts on large orders. To obtain these large discounts, a purchasing agreement is

supplied by the dealer. Caution should be exercised in signing such agreements so that there is not a commitment to a single retailer or brand of microcomputer.

Microcomputers carry a 90-day warranty. The purchase of an extended annual service contract, which costs approximately $250 (an item to be included in a department's operating budget) is strongly recommended. The extended contract can cover mail, drop off service, or on-site service, and the price increases respectively.

Most microcomputer sales and marketing persons are new to computing, tend to know computer terminology, but have little prior experience. Sales people cannot be expected to be experts and your knowledge about computers may be broader than theirs. Bargain shopping for computers has many drawbacks. Although mail order purchasing provides substantial savings, there is no simple method for obtaining service when equipment malfunctions.

A microcomputer system with two disk drives and a monitor costs from $3,000 to $5,000 and another $1,000 needs to be budgeted for software. Hardware costs continue to drop, but software prices are rising. Following an initial microcomputer purchase, from $300 to $800 needs to be budgeted annually for maintenance, supplies, software and hardware expansion (for example, more memory). The good news about microcomputers is that an incredible amount of computational power can be purchased for $5,000. The bad news is that the system you purchase today will be useable, but totally obsolete in five years.

With the exception of VisiCalc, there are few outstanding programs on microcomputers. Microcomputer software is designed more for profit value than for quality. Software companies struggle to keep pace with continuously changing hardware; consequently products have been poorly designed, minimally tested and lack quality control. Documentation is often limited and training is never included in purchase costs. Educom, NerComp, and other groups offer support to educational microcomputer users, but with 150 different products on the market, your computing center personnel may not be able to assist you with a specific brand. Since an IR office often has technical personnel, it may assume the responsibility for training other administrators and assuring compatability of microcomputer systems on the campus.

RECENT MCIROCOMPUTER DEVELOPMENTS AND FUTURE TRENDS

Some of the new developments in microcomputing in the past year are shown is Table 1. During this period the number of microcomputer manufacturers grew from 75 to approximately 150; three mainframe companies, Digital, Wang, and Burroughs entered the market; Japanese companies became formidable competitors. With such a market, forecasting future developments is difficult. Certainly there will be many enhancements in networks and communications and clearly a large increase in competitors in the 32-bit market. During the next year we can also envision: major improvements in high capacity storage devices, significant development in flat screens and battery packs, more research in non-volatile (bubble) memory, the opening of training centers throughout the country, and the vanishing of many small hardware and software companies. Within a few years the primary competitors in the microcomputer industry will surface and many small companies will be consumed. In the longer range standards will be established and the quality of both hardware and software should improve. The rapid advancement in technology, seen to date, will probably not slow its pace before the end of the decade.

While the foregoing may suggest that it would be wise to wait to purchase a microcomputer, these systems offer major increases in productivity and higher quality results which means producing work faster and better. With increasing competition between institutions of higher education, advanced technology can help your university stay at the forefront.

A LAST BYTE

At Tufts University we have done considerable research into microcomputer hardware and have developed minimum specifications for our environment shown in Table 2. A comparison of 26 microcomputer systems can be obtained from the author.

Table 1

New Developments in Microcomputing

- Color dot matrix printer
- Low cost formed character printer ($500 down from $2000)
- 68000 microprocessor
- Winchester hard disk (5MB to 50MB)
- Hard disk with removable cartridges
- 3 1/2" diskette (capacity 870K)
- 128K-4M bytes of RAM (up from 64K)
- Bubble memory chip (256K - non volatile)
- Flat screen
- 4-line, 80-character LCD display (liquid crystal)
- Battery operated portable microcomputer
- HASCI keyboard (H for Human)
- 150 character display
- 1000 x 1000 screen graphic resolution
- Micro-based local area network
- Transportable code (e.g. p-code for Pascal)
- Robot arm controllers
- 3-dimensional graphics tablet

Table 2

Minimum MICROCOMPUTER Specifications
Computer Services - Tufts University

Feature	Requirement	Comment
	HARDWARE	
CPU:	8 bit - Z80A or Z80B 16 bit - 8086, 8088, MC68000	Needed to run operating systems specified below.
Memory:	8 bit - 64K 16 bit - 128K	Needed for Pascal, FORTRAN, and other software.
Char. Set.:	128 ASCII	Needed for communications.
Display:	80 x 24 Upper and lower case Bit mapped graphics	Needed for word processing. As above. Faster and saves RAM for other purposes.
Communic.:	RS-232C port (serial)	Industry standard for peripheral compatability.
Printer:	RS-232 (serial) or Centronics (parallel) port	As above.
Disk Drives:	Support for 2 drives - with one 5" floppy $\geq$ 320 KB capacity and second 5" or 8" floppy	Efficiency and interchangeability between systems.
Keyboard:	ANSI standard including ESCAPE, BREAK, CONTROL, BKSP, TAB, CAPS LOCK, SHIFT, cursor keys and numeric keypad.	Needed for communications and editing functions.

OTHER FEATURES

Expandable/upgradeable, on-site service available, good company reputation

SOFTWARE

Error correcting communications (CX/DX or IE Modem), CP/M, CP/M-86 or MS-DOS operating systems, word processor support or editor, Visicalc or similar modeling/simulation system, graphics, database support, and languages: BASIC, Pascal, C, and FORTRAN

STRATEGIC PLANNING: WORKING WITH DEPARTMENT CHAIRS

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INTRODUCTION

The present crisis in higher education, the "panorama of misery", if you will, raises serious questions about the future of higher education in the country. More specifically, can colleges and universities maintain flexibility and viability, preserve quality, be accountable, and respond effectively to the changing needs of society within the context of budgetary cuts, inflation, dwindling endowments and declining enrollments? Can retrenchment of faculty proceed without injury to academic vitality, without the erosion of faculty morale, and without a loss of curricular coherence?

Although the key issues of the eighties in higher education are certainly economic in nature, I would argue that the "micro" consequences of the policies adopted to deal with economic contingencies may well determine whether or not colleges and universities can continue to be places in which creativity and excitement about learning can be promoted.

There is no question that institutional vitality is commonly regarded in economic terms as is the vitality of a city, a region, or an entire nation. Any number of indicators can provide a relatively simple and inexpensive way of monitoring fiscal health in a small private college: performance against inflation, cash flow, return on endowment, money set

aside for maintenance, number of student applications relative to enrollment, retention of students, expenditures per student, and so on. It is essential that small colleges understand these and other economic indicators as the vital signs that they really are.

However, there is another dimension of the vitality question: the social and psychological components of an alive and vibrant institution. Even if economic indicators remain relatively stable during the eighties, many of those in the academic profession, and especially those in small colleges, are likely to face a great deal of both professional and personal uncertainty. Added to this uncertainty will be a number of constraints that appear now to be almost inevitable consequences of many of the trends we can currently detect. It seems rather certain that job mobility will be low. The average age of college faculty will increase dramatically. With less money for travel and professional development, there will no doubt be fewer opportunities for professional interchange.

Together, all of these factors, and others now only dimly perceived, can bring about a rapid deterioration of morale, a sharp drop in the "volunteerism" which small, private colleges tend to live on, an increase in the phenomenon of burnout, an inability to stay abreast of one's field, and extraordinary levels of interpersonal conflicts. And yet, the primary problem in the contemporary, small, private college is that to key administrators life often seems, or is, a daily struggle for economic survival. Short-term pragmatic decision-making is the order to the day, and bits and pieces of quantitative data often override qualitative considerations. In this kind of environment, planning is difficult and attention to the micro-concerns of the quality of life in the institution becomes almost completely obscured. Yet, in the 1980s, institutional research must find ways to become more person-oriented and more interested in ways of collecting and organizing the

qualitative information which can support and inform the strategies we evolve in order to cope with the issues confronting us.

PURPOSE

The rapidly increasing complexities involved in the various aspects of operating institutions, both large and small, within the environment I have just described, have resulted over the past years in increased delegation of responsibility from deans and others to department chairs. Academic departments are the organizational units within an institution which are most severely affected by this state of affairs. There are alternatives to the academic department, such as divisions of related disciplines or schools and colleges without formalized sub-divisions, but the fact remains that the academic department constitutes the prevailing pattern of organization for the planning and management of the learning process and or research, creative activity, and public service. Department chairs are middle-managers in the decision-making process. They are the chief planners. Their day-to-day decisions do impact the future of their departments and institutions.

How can institutional researchers assist academic department chairs in strategic planning and in confronting the issues during this "shallow valley" period of higher education?

What evolved at Saint Joseph College was a series of three planning workshops over the academic year 1982-1983, each four hours long followed by cocktails. The purpose of this paper is to describe the first planning workshop.

ASSUMPTIONS AND OBJECTIVES

This particular workshop strategy at Saint Joseph College was based upon the following assumptions:

1. That the department chairperson is a primary filter affecting academic change and climate within an institution of higher learn-

ing. A fair amount of research indicates that climate or quality of life existing within a college may be the single, most powerful element affecting teaching and student performance;

2. That more sharing of information and strategies would reduce the sense of isolation and encourage interaction among academic leaders at the departmental level;

3. That the department chairperson plays a critical role as mentor, as connector between departmental faculty and their respective divisions;

4. That a more thorough understanding of the college as an institution and organization will result in a commitment to mission and shared perceptions of the mission which will be both a source of pride and uniqueness for the college;

5. That sound academic planning requires both a theoretical framework and reliable data analysis.

Flowing from these assumptions, the following objectives emerged:

1. Owning the theoretical framework for planning, that is those overarching principles of the College guiding the planning process (e.g., mission statement, college-wide goals and objectives, planning and budgeting guidelines approved by the Board of Trustees);

2. Assisting chairs in articulating the goals and objectives of their departments within the broader framework of the College and in appreciating the interlocking nature of each;

3. Assisting chairs in analyzing data, in taking basic institutional data and combining it with departmental data to provide solutions to imbalances;

4. Assisting chairs in developing strategies for implementing Board of Trustees planning and budgeting guidelines;

5. Challenging chairs to see the positive elements of retrenchment rather than the negative features of movement away from what has been;

6. Challenging chairs to move beyond an either/or approach to change and exploit the creative tension between retrenchment and revitalization;

7. Creating a climate which empowers individuals to be participants in the fulfillment of the mission and to have the sense of being involved in a creative, productive, and energizing work life.

PLANNING AT SAINT JOSEPH COLLEGE

During 1980-1981, planning activities at Saint Joseph College focused on the revision, reaffirmation, and updating of the mission statement of the College. This mission statement, along with supporting goals and objectives, was hammered out by all constituencies of the College and adopted in the Fall of 1981. On April 28, 1982 the Board of Trustees approved planning guidelines intended to provide a policy framework within which faculty and administrators may plan for the next three fiscal years, FY1983, FY1984, FY1985.

Saint Joseph College's planning and budgeting efforts have been refined over the past two years, Attempts have been made to integrate planning activities and budgeting activities into a comprehensive, unified process; that integrated process was implemented during 1981-1982, when a new Planning and Budgeting Committee advisory to the President was formed in November, 1981. The Planning and Budgeting Committee, chaired by the President, is a College-wide committee which advises the President on all matters pertaining to planning and budgeting. The committee consists of nine voting members: the undergraduate and graduate Deans, The Treasurer, the Dean of Students, the Director of Development and Public Relations, three faculty elected by the faculty, and the President of the Student Government Association.

Functions of the Planning and Budgeting Committee include the following:

1. To assist the President in the development and updating of a long-range plan consistent with the College's mission and objectives and guidelines set by the Board of Trustees;

2. To recommend to the President a balanced budget for review by the Board of Trustees;

3. To provide advice to the President on:

a) Strategy for integrating planning and budgeting efforts;

b) Strategy for the involvement of various constituencies of the College;

c) Forms used for annual reports and budget requests;

d) Coordination of regular programmatic evaluation with the planning and budgeting process;

e) Optimum utilization of human, physical, and fiscal resources.

In addition to the establishment of the Planning and Budgeting Committee, other steps were taken during the past academic year to integrate planning and budgeting. Forms used by academic and administrative unit heads for planning proposals and budget requests were drawn up so that they were complementary, and so that the unit heads could project both plans and budgets for a three-year period. This Fall, a comprehensive list of key dates for both planning and budgeting and a planning/budgeting calendar were issued by the President, in order to illustrate and facilitate an integrated approach to the combined processes along the time-line of the academic year.

CONTEXT OF SAINT JOSEPH COLLEGE

Saint Joseph College occupies 84 acres of residential area on Asylum Avenue in West Hartford, Connecticut. A women's undergraduate institution, combining liberal education with career preparation, it enrolls 855 students, and has had a 62% increase in enrollment during the decade of the 1970s when women's colleges experienced a net gain of 15%. The graduate program, open to men and women, enrolls about 400 students each semester. It has a modest endowment, has always operated in the black, has no deferred maintenance and predicts a stabilization of enrollment over the next three years. It has 62 FTE faculty and an overall institution faculty/student ratio of 1:11.

PLANNING WORKSHOP AGENDA

I. General Framework for Planning

   A. Mission, Goals and Objectives

   B. Board of Trustees Planning Guidelines

   C. Revenue and Expenditure Assumptions

   D. Some Suggested Strategies for Dealing with Board of Trustees Guidelines

II. Planning and Budgeting Forms Explanation (See Exhibits 1 and 2)

III. Institutional and Departmental Data for Planning

Exhibit 1

PLANNING REPORT

Unit_____ Division_____

Date Submitted

SECTION I

Statement of Purpose for the Planning and Budgeting Unit

In this section state concisely and clearly the purpose or mission of your department or office. Focus on your strengths. Indicate the specific and unique contributions of your particular unit to accomplishing the College's mission. In your statement and purpose, identify the emphasis, scope and character of your programs and how you best serve the College. A review of your strengths and unique contributions to the College's mission will assist all of us in determining which services, programs, and activities are essential to Saint Joseph College's success, and which ones might be less necessary in the decade ahead.

SECTION II (Forms)

Planning and Budgeting Objectives, in Priority Order, for 1982-1983, 1983-1984, 1984-1985

For each objective, listed in priority order for implementation over the next three years:

1. List the all-College goal and objective which your proposal supports, and explain briefly how it is supportive. (See college-wide goals and objectives.)

2. In justifying your proposal:
   ...if the proposal is to add, explain why the item is necessary and the benefits you and the College will derive from its addition;
   ...if the proposal is to delete, explain why the component is identified for deletion and the potential savings you and the College will derive from its deletion;
   ...if the proposal is to change, explain how the item will complement or strengthen a current program, or how you and the College will benefit from the change;
   ...if the proposal is to substitute one program for another, indicate a deletion and an addition as two goals, with the appropriate explanation(s).

3. Discuss the anticipated costs and/or savings and/or income generated by your proposals to accomplish your goals and/or objectives:
   ...using 1981-1982 as the base budget year, describe, for each goal or objective, any additional costs, anticipated savings, or substituted expenditures;
   ...for each goal or objective, indicate its effect, if any, on your total departmental/office budget;
   ...keep in mind the all-Collge budgeting and planning guidelines of the Trustees with regard to increasing numbers of faculty and staff, etc.

SECTION III

Long-Range Ideas to Explore

1. Department/Office/Program
   In this part, propose ideas which your specific area of the College plans to investigate, or which your staff proposes to look into in future planning.

2. All-College
   In this part, propose ideas outside your department or office or program for consideration in future planning sessions or by others at the College. Be as specific as possible. Identify other groups or persons who might share an interest or concern in these items.

8/82

P = Personnel
S&E = Supplies & Expenses
R&R = Renewal and Replacement
S = Space

SAINT JOSEPH COLLEGE

PLANNING PRIORITIES
1982-83 through 1984-85

Divisions of the College:
Academic - (Undergraduate)
Academic - (Graduate)
Student Services
Development & Public Relations
Business & Administrative Services

Division _____ Date Submitted: _____

Unit _____

Priority	Proposal for addition, deletion, or change in departmental programs, majors, concentrations, activities, services	Budget Category	COSTS 1982-1983	1983-1984	1984-1985
High	Goal #:	P			
		S&E			
		R&R			
		S			

College Goal and Objective Supported, and How:

Justification of the Objective:

Discussion of Costs and/or Savings or Income Generated:

Exhibit 2

SPECIFIC RESULTS OF WORKSHOP

Some tentative claims of success can be made:

1. Departmental chairs have a broader conception of departmental atmosphere as a key to student and faculty morale and productivity.

2. Curriculum development, program costing methodologies, institutional research/HEGIS language--FTE, SCH--are poorly understood by many academic leaders.

3. Many academic leaders are unaware of the substantial economic commitment made by an institution in the act of hiring a faculty member.

4. Department chairs see the College as a more "complex" organization.

5. In the words of one participant, there was a sense that "someone was really at the helm, guiding the institution."

6. There was an "upbeat" atmosphere after the meeting: "We have the guidelines, we have the data. Now we know what to do. We just have to go ahead and do it!"

7. The workshop increased both the confidence and competence of department chairpersons and created an atmosphere wherein these academic leaders feel appreciated and more eager to cooperate with central administration as partners in confronting the challenges of the 80s.

ON-GOING QUESTIONS AND SOME CANTANKEROUS CONTENTIONS

During the course of planning and implementing this academic planning workshop, several questions and some cantankerous contentions about the academy emerge:

1. How long do the effects of such a planning workshop last?

2. There exists little clarity about the expectations which academic chairs must meet not only in planning but in other related activities.

3. Department chairs often lack direct access to, and inherit multiple interpretations of, central administration plans.

4. Listening is a competency poorly developed by many academic leaders.

5. Academic institutions rarely provide ample opportunities for informal interaction in enriched surroundings for academic leaders.

6. Academic institutions rarely provide special time for thought and conversation on issues of substance by academic leaders.

7. Basic humanism in academic work is the only sufficient offset to low compensation for academic leaders.

Of course, these all await, I might add, solid empirical verification.

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Planning and Computing in Theological Seminaries

by
Alexander M. Jones and Daniel A. Updegrove
EDUCOM

In March 1980 the Religion Division of the Lilly Endowment awarded a grant to EDUCOM for a project of "research and development of cost effective planning tools for theological seminaries." In this project, EDUCOM staff worked with administrators at eleven seminaries to evaluate the usefulness of computer-based financial planning models. In addition, when it became apparent that some seminaries were not prepared to use planning models effectively because of outmoded data processing operations, EDUCOM extended the project to provide consulting on hardware and software options and systems management at several of the seminaries. (1)

By the end of the project (July, 1982), four seminaries reported that models were "integral" to their planning and four reported that models were "useful adjuncts". Both EDUCOM's EFPM modeling system and microcomputer-based systems were used successfully; EDUCOM concluded that most seminaries should use microcomputers because of their lower cost and ease of use. (2)

To test the generality of these findings, EDUCOM sent a questionnaire on planning and computing to the chief executive officers of all 192 seminaries affiliated with the Association of Theological Schools. The survey was mailed in March, 1982 with one followup in April. Completed questionnaires were received from 106 institutions (55%), with most returned by chief executive or chief business officers. It must be pointed out, of course, that despite the

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(1) For details see Alexander M. Jones and Ronald L. Orcutt, "Computers in Theological Seminaries: Strategies, Options, and Services," Princeton: EDUCOM, 1982.

(2) For details see Daniel A. Updegrove and Carole C. Shields, "Financial Planning in Small Institutions: A Case Study of Theological Seminaries," EDUCOM Bulletin 17, No. 3, Fall 1982, pp. 23-27.

high response rate there is the potential problem of non-response bias in the results. That is, one would expect a lower response rate from seminary officers less interested in planning and computing.

PLANNING IN SEMINARIES

Among the basic premises of the project were the perceptions that seminaries did not, in general, appreciate the need for planning, did not practice effective planning, and and did not have the personnel, experience, and tools necessary for effective planning. During the course of the project, we had the opportunity to deal with eleven selected seminaries that, to varying degrees, were exceptions to these basic perceptions. In dealing with the participating seminaries, we were exposed also to evidence that attitudes and practices are changing.

Seminaries Believe They Need More Planning

Of the 106 respondents, 82 indicated "we need to do more planning in the next two years," while 21 felt the current level of planning was adequate, and 2 felt that less planning would be more appropriate. Interestingly, there is a clear sense that the need for planning is increasing, since a separate question about the current situation (as opposed to the future) produced the following answers: 66 "we do too little", 37 "we do the right amount", and 2 "we do too much".

Seminaries Plan, Or At Least Believe They Plan

One of the questions asked "Over what time period do you plan for each of the following?", and a list of 9 specific categories. For each category, respondents could specify "current year only", "next year", "2-3 years", "4-5 years", 6-10 years", or "more than 10 years". If we categorize "not applicable", "no response", and "current year only" as "no planning", "next year" as "short-term planning", and the other categories as "long term planning", we obtain the following results:

TABLE I

Planning Practice By Category

Category	No Planning	Short Term	Long Term
Operating Budget	13%	52%	35%
Capital Budget	15%	31%	54%
Development	17%	29%	54%
Endowment	22%	22%	56%
Academic Program	8%	27%	65%
Enrollment	11%	39%	50%
Faculty Tenure	25%	9%	66%
Space and Facilities	18%	15%	67%
Computers and Data Procesing	47%	26%	27%

These numbers do not necessarily indicate "effective planning" or "serious commitment to planning", but they make it clear that respondents perceive that planning is going on.

Boards Want Better Planning

The evolution of planning in seminaries will be strongly influenced by the attitudes of seminary boards. While the survey was distributed to CEO's, rather than board members, several important inferences can be drawn. Eighty-four respondents indicated "our board is interested in better planning", while only four indicated "our board is not interested in better planning". Most respondents indicated that trustees are involved in the planning process, either the entire board (35%) or a committee of the board (65%).

Impediments Are Recognized

There are many impediments to effective planning in seminaries: historical attitudes toward planning and the consequent lack of experience; small size and small staff, etc. These impediments cannot be overcome until they are recognized, and the following results indicate that recognition has occurred:

42% We don't have enough staff to do the planning we need.

58% We don't have staff trained in the appropriate analytical techniques needed to do better planning.

38% We lack the data required to do better planning.

25% We don't know what data are required for better planning.

47% We would like to use computer-based tools for planning. [We assume this implies they don't or can't.]

The perceived need for better planning may lead to efforts to overcome these obstacles.

Broad-based Planning Efforts

In response to the question "Who is involved in planning at your seminary?" the following responses were received, indicating that most planning processes are broad-based:

65% - A Committee of the Board
35% - Entire Board of Trustees
95% - Chief Exec Officer (Pres. or Dean)
18% - Executive Vice President
56% - Vice President for Academic Affairs or Provost
61% - Vice President or Director of Finance/Administration
53% - Vice President or Director of Development
15% - Vice President or Director of Planning
77% - Other Staff
51% - Faculty Committee
35% - Entire Faculty
20% - Student Committee
4% - All Students
10% - Alumni Committee
4% - Other

Multi-institutional Planning

Several questions addressed the issue of joint planning by groups of seminaries. Of the 55 institutions participating in local or regional consortia, 38 (a surprising 69%) indicated that cooperative planning took place. Only 20 of the 66 (30%) denominational seminaries indicated that denomination-wide planning occurred.

Disparate Time Frames

The time-horizon data used to create Table I provides some insight into the amount of "lookahead" practiced in various planning areas:

TABLE II

Planning Horizon in Years

	0[1]	1	2-3	4-5	6-10	10+	Ave[2]
Faculty Tenure	27	10	18	28	13	10	5.5
Endowment	23	23	15	31	10	4	4.1
Space and Facilities	19	16	22	33	15	1	4.0
Development	18	31	21	31	5	0	3.0
Capital Budget	16	33	20	32	4	1	3.0
Academic Program	9	29	36	31	1	0	2.8
Student Enrollment	12	41	24	25	3	1	2.7
Operating Budget	14	55	12	22	3	0	2.3
Computers & Data Processing	50	28	14	12	2	0	2.0

Notes:

1) "0" includes "current year only", "not applicable", and no response.
2) This average is calculated from the data in the last 5 columns ("current year only", etc. are excluded). In the calculation of the average, 2.5 was used for "2-3", 4.5 for "4-5", 8 for "6-10", and 15 for "10+".

These numbers are interesting and display some significant information, but they must be interperted with care. In particular, several biasing factors should be noted: the "five year projection" is a traditional planning practice leading to a bump in the "4-5" column. Often, most of the actual "planning" involves the first few columns of the traditional report. In addition, there are many interactions among the categories, such that planning for one category (say capital budget) may lead to the appearance of similar term planning for another category (e.g., development) when such planning does not occur.

The "average", while a useful indicator of areas which are more likely to have long term planning significance, does not reflect normal practice. 2.7, for instance, does not indicate that anyone has a 2.7 year planning horizon, but rather a roughly equal division between 1 year horizons and 4-5 year horizons. The numbers in the first column do not necessarily represent anything real (failure to plan or incompetence) since various circumstances and structures may make the category uncontrollable or irrelevant (e.g. endowment planning for an unendowed institution, various categories for seminaries which are part of larger institutions).

The table is ranked in order of "average", and that order is not particularly surprising. A few observations and comments follow:

Tenure: It is not surprising that this category leads the list, since the long term importance of tenure decisions is obvious, and the implications of particular decisions are relatively easy to determine.

Endowment and Space and Facilities: These categories both naturally involve long term policies and decisions, and thus imply lengthy planning horizons.

Capital Budget and Development: These are both "fuzzy" areas. Long term planning in these areas is likely to be categorized under Space and Facilities or Endowment, and the short term details as the "planning" in the area. A reverse bias may occur for institutions in capital campaigns.

Academic Program: This is the only category for which the 2-3 year period dominates -- probably because the typical M. Div. program is three years long.

Enrollment: This is also potentially misleading, since the processes involved are very different. The clear, open, widely visible coping with admissions is very different from the long term process of coping with enrollment trends.

Operating Budget: The indicated short term nature of operating budget planning is a matter for serious concern. The operating budget, is, in many ways, the critical component of institutional planning. In general, the interaction of all the other categories occurs in the operating budget. In the long term, institutional viability is constrained by the necessity of reasonable operating balance, and plans in all other areas must be evaluated in terms of the maintenance of that balance. In addition, short-term operating budget planning provides extraordinary opportunities for mistakes. Next year's deficit can be covered, for instance, by deferring maintenance, by borrowing, or by over-spending endowment income. Each of these actions has two serious implications:

- o future expenses are increased (or income reduced)
- o nothing is done to correct the real imbalance in the budget, which is thus likely to persist and probably get worse.

Good, long term operating budget planning is a complex and difficult endeavor, but it is absolutely necessary, since it defines the context of all other activities.

Computers and Data Processing: This category has been relevant to seminaries for only a short time, so long term planning processes have not yet evolved. In addition, rapidly changing technology makes long term planning difficult.

Conclusions

From this survey and our experience, we conclude that:

1) The officers of theological seminaries are well aware of the need for effective planning.
2) "Planning" is widely practiced in theological education, but the types of planning and the time horizons used vary widely.
3) Current planning practices are perceived to be less effective than they should be.
4) Many of the impediments to effective planning are widely recognized.
5) Trustees and administrators are motivated to achieve effective planning.
6) Lack of operating budget planning beyond the next year is a serious problem in many seminaries.
7) Computer-based modeling tools like EFPM and VisiCalc have been shown to be effective aids to planning in seminaries and their use should be encouraged.

COMPUTING IN SEMINARIES

This section addresses three particular issues: perceived need for specific computer services, degree to which these services have already been computerized in theological education, and degree to which computerization is perceived to be satisfactory. The question from which this section was derived asked, "Please evaluate the following functions in the seminary". Four possible answers were specified for each of the seventeen functions:

- o Doesn't Need a Computer
- o Should be Computerized (but isn't)
- o Computerized -- adequately
- o Computerized -- inadequately

Not all respondents answered the question for all of the functions and some specified "other", or "not applicable", etc. The handling of these responses is outlined in the specific sections below.

Perceived Need for Computerized Service

Perhaps the most dramatic result of the survey is that those who run seminaries believe they need computerized services. Table III indicates the level of perceived need. For each service, two percentages are given. The lower number assumes that all non-responses for a particular service should be interpreted as "doesn't need a computer", while the higher number ignores the non-responses. In both cases, "should be computerized", "computerized adequately", and "computerized inadequately" are assumed to imply that the computerized service is perceived to be needed. The questionnaire did not define "need"; it is likely that some responses should be interpreted as "it would be nice if...", as opposed to "absolute necessity".

TABLE III
Perceived Need for Computerized Services

	Low Estimate	High Estimate
Accounting - General Ledger	82%	87%
Accounting - Accounts Receivable	78%	83%
Accounting - Accounts Payable	78%	83%
Development	75%	89%
Payroll	77%	85%
Personnel Records	52%	60%
Student Records	73%	81%
Financial Planning	69%	85%
WP - Administration	71%	84%
WP - Faculty	55%	71%
WP - Students	31%	45%
WP - Publications	56%	73%

Library - Catalog	75%	88%
Library - Circulation	56%	68%
Instruction	26%	40%
Faculty Research	36%	48%
Auxiliaries	42%	58%

There is clear consensus that traditional accounting and payroll functions in seminaries should be automated and a general sense that most of the other listed functions should be as well. By addition of the raw data, and ignoring non-responses, it can be seen that 1093 of 1485 possible functions "need to be computerized." (This works out to 74% or about 12.6 functions per institution.) Some comments with regard to specific services are in order.

- The numbers for "financial planning" may be inflated because earlier sections of the questionnaire focused on financial planning issues and resources.
- The "word is out" on word processing, at least for administrative and publications activities. (Much of the credit for this can be attributed to the recent "blitz" of advertising from many vendors.)
- The high numbers for "library catalog" can be attributed to the well known, high quality service distributed by OCLC, Inc.
- It is not clear to what degree the low numbers for services deliverable to faculty and students (as opposed to administrative services) can be attributed to the fact that the questionnaire was distributed solely to administrators.

The overall message, however, is this: "Seminary officers know they need computing services".

Use of Computerized Services in Theological Education

Clearly, it is easier to recognize a need than to do something about it. The data summarized in Table IV indicate that seminaries have implemented more computer systems than would have been expected. These figures represent the computerization of services from any source (seminary-owned equipment, services from affiliated institutions, services purchased from service bureaus, etc.). Again, two numbers are given for each service; the low estimate includes non-respondents as if they did not have the service, the high estimate ignores them. "Use as percentage of need" relates actual use to perceived need (ignoring non-respondents).

TABLE IV
Actual Use of Computerized Services

	Usage low and high estimates	"Use" as % of "need"
Accounting - General Ledger	50% - 53%	61%
Accounting - Accounts Receivable	49% - 52%	63%
Accounting - Accounts Payable	48% - 51%	61%
Development	40% - 47%	53%
Payroll	54% - 59%	70%
Personnel Records	20% - 23%	38%
Student Records	37% - 38%	47%
Financial Planning	23% - 28%	33%
WP - Administration	28% - 34%	40%
WP - Faculty	24% - 30%	43%
WP - Students	14% - 21%	45%
WP - Publications	20% - 26%	46%
Library - Catalog	42% - 48%	55%
Library - Circulation	25% - 30%	44%
Instruction	8% - 13%	32%
Faculty Research	10% - 14%	29%
Auxiliaries	19% - 26%	45%

These figures make it clear that the use of computerized services is widespread in seminaries. In one area, payroll, computerization is the rule, rather than the exception. Overall, summing the raw data indicates that 537 of 1093 "needed" functions have been computerized, for a combined "use as percentage of need" of 49%. Again, several observations are in order.

- o Some of the higher numbers can be traced to the availability of well known, high quality external services (commercial payroll service bureaus, and OCLC).
- o Roughly half of the seminaries surveyed now use computerized basic accounting functions.
- o The "use as % of need" numbers are generally low. We suspect that the explanation could be one or more of the following: computers are perceived to be too expensive; computers are a lower priority than other expenditures; decisions about computing expenditures are complex and risky so they are often deferred; the perception of need is a recent one.

Satisfaction with Computerized Services

Finally, by looking at the "adquate/inadequate" responses, we can develop some understanding of the degree of satisfaction with specific computerized services. Table V lists the total number of computerizations of each service, the number characterized as adequate, and the percentage. In the cases marked with an asterisk, the number of implementations is small, and the results cannot be viewed as reliable.

TABLE V
Adequacy of Computerized Services

	"Computerized"	"Adequate"	Percentage
Accounting - General Ledger	53	51	96%
Accounting - Accounts Receivable	52	48	92%
Accounting - Accounts Payable	51	48	94%
Development	42	27	64%
Payroll	57	55	96%
Personnel Records	21	15	71%
Student Records	36	30	83%
Financial Planning	24	15	63%
WP - Administration	30	22	73%
WP - Faculty	25	20	80%
WP - Students	15	6	40%*
WP - Publications	21	12	57%
Library - catalog	44	40	91%
Library - circulation	26	19	73%
Instruction	9	6	67%*
Faculty Research	11	5	45%*
Auxiliaries	20	15	75%

These numbers indicate that the most commonly computerized services (basic accounting functions, payroll, and library catalog) have, in general, been adequately implemented. Overall, 434 of 537 functions have been "adequately" computerized (81%). Certain other points should be noted.

- "Inadequate" can mean one of three things: 1) the implementation of the computerized function was a poor one, 2) experience with a system has led to perceptions of need for greater capacity or increased function, or 3) the system involved has become overloaded, and no longer performs some of its functions adequately.

- The low level of adequacy of "development" systems can be traced to several factors: increased dependence by seminaries on fund-raising and increased understanding that a computerized system for a development office should do more than just produce mailing labels. The ideal system should link to word processing for generation of customized form letters and reports, to the accounting system for automated processing of gift transactions, and to a data base management system for analysis and decision support.

- Word Processing is a contagious phenomenon -- initial systems with limited capacity breed demand for increased capacity and function.

- "Financial Planning" is an especially difficult area, partly because the technology is relatively new, and largely because financial planning itself is a difficult process these days (and one that, until recently, received little attention in theological education).

Conclusions

While no specific seminary is "average", or "normal" or "typical", the survey data can be combined to produce the following characterization of the "average" seminary: It "needs" about 12.5 computerized functions; It "has" about 6 computerized functions; Of those functions, about 5 are viewed as adequate.

It could be concluded that the officers of theological seminaries perceive the needs for computerized services, are well started along the road to implementing those services, and are generally satisfied with the results to date. We would, however, caution the seminary community against an overly sanguine view of computing. In particular we point out the following concerns:

- Some seminaries have little or no experience.

- The number of hardware and software options is bewilderingly large -- and growing.

- As computer use grows, more sophisticated management is required.

Therefore, we urge seminaries to adopt the resource sharing and consulting services of consortia used by colleges and universities to deal with the complex computing environment of the eighties.

THE ECONOMIC CONTRIBUTION OF THE CONSORTIUM OF UNIVERSITIES TO THE WASHINGTON METROPOLITAN AREA*

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The Washington National Capital Area has continued to expand in the decade of the 1970's. The more important of these changes as noted by Shidler are trends which have continued from the 1960's and include decreasing household size, increasing proportion of women participating in the labor force, upward job mobility of black and other minorities and a proportionate increase in professional, technical, managerial and administrative employment. Economic growth can be attributed partly to changes in the composition of the area's population, employment and labor force. Contributing to this economic growth in a rather complex way are the myriad activities of the various universities and colleges within the area.

The core of the Washington National Capital Area is the District of Columbia, a complex jurisdiction which is the seat of the nation's government and also a political-economic entity which has some of the characteristics of a state. From a higher education viewpoint, the District of Columbia, when considered as a state, is first among all the states in the percentage of out-of-state students (73%). The District is also first among the states in the percentage of total enrollment in private institutions (over 80%).

The private and public institutions of higher education within the District of Columbia belong to The Consortium of Universities of the Washington Metropolitan Area. The Consortium consists of American

*This work was a collaborative effort of W. Agee, American University, M. Bell, Georgetown University, W. D. Johnson, George Washington University and J. P. Whalen, The Washington Consortium of Universities.

University, The Catholic University of America, George Washington University, Georgetown University, Howard University, The University of the District of Columbia, Gallaudet College, Mount Vernon College and Trinity College.

The objective of this study is to develop an estimate of the economic contribution of the Consortium institutions to the District of Columbia and to the adjacent political jurisdictions of Maryland and Virginia. Maryland and Virginia are considered because of the close economic interrelationships of the three jurisdictions within the area. However, most of the economic contribution or impact occurs in the counties of Maryland and Virginia nearest the District of Columbia. It should be noted that finer degrees of political juirisdictions can readily be used by, for example, using United States postal ZIP code classifications to obtain more geographic refinement. Important aspects of the study are to produce results that are credible and readily accepted by the various publics, to develop an analysis easily understood by the political environment, and to develop a tool for effective long range planning.

It is important to note that the economic effects to be analyzed are current and short range. In this study no account is taken of such long range effects as the upgrading of professional manpower, the contribution of scientific research and training to business and government or the attractiveness of the Metropolitan Area as a desirable place for either residence or as a location of research and development activities. However, the long range effects on the national economy and the lifetime income and productivity of graduates are important long-term benefits to the community.

The methodology of the study uses simple linear relationships incorporating what can readily be counted but omitting from quantification factors which can be termed "quality of life" issues. It is these latter issues which usually lead to disagreements on the validity and hence the acceptance of similar studies because the process

of quantification brings to the surface various values and their relative relationships as a system. These disagreements can lead to a loss of credibility and hence compromise one of its prime objectives. However, these qualitative factors do in some cases contain quantitative factors and some of these were investigated without incorporating them into an estimate of their economic contribution. It is believed that the study presents a conservative estimate of the magnitude of the economic contribution because it does not take into direct account political, social and aesthetic factors or the effects of the institutions' human resources upon the community.

THE CASH-FLOW MODEL

To estimate the economic contribution or impact of the Consortium of Washington Universities to the Washington region, a modified cash-flow model as described by Caffrey and Issacs and by Montgomery et.al. is used. The model developes estimates of aggregate demands in the community resulting from expenditures by the academic institutions as well as by groups of individuals associated with the institutions. Three groups of individiuals are identified in this study in addition to the Consortium as a collective corporation viz. Faculty and Staff, Students and Visitors.

A flow diagram of operational and capital expenditure cash flow as used in the analysis is presented in Figure 1. The Consortium institutions pay salaries and wages to faculty and staff who in turn purchase goods and services in the District of Columbia, Maryland and Virginia. In addition faculty and staff pay taxes to these jurisdictions. The Consortium academic institutions grant funds to students as student aid in the form of grants and awards. Students in turn use these funds to purchase goods and services and pay taxes. The Consortium institutions also attract visitors because of their programmatic offerings (student applicants and families, research participants, etc.) and in addition offer short-term programs such as

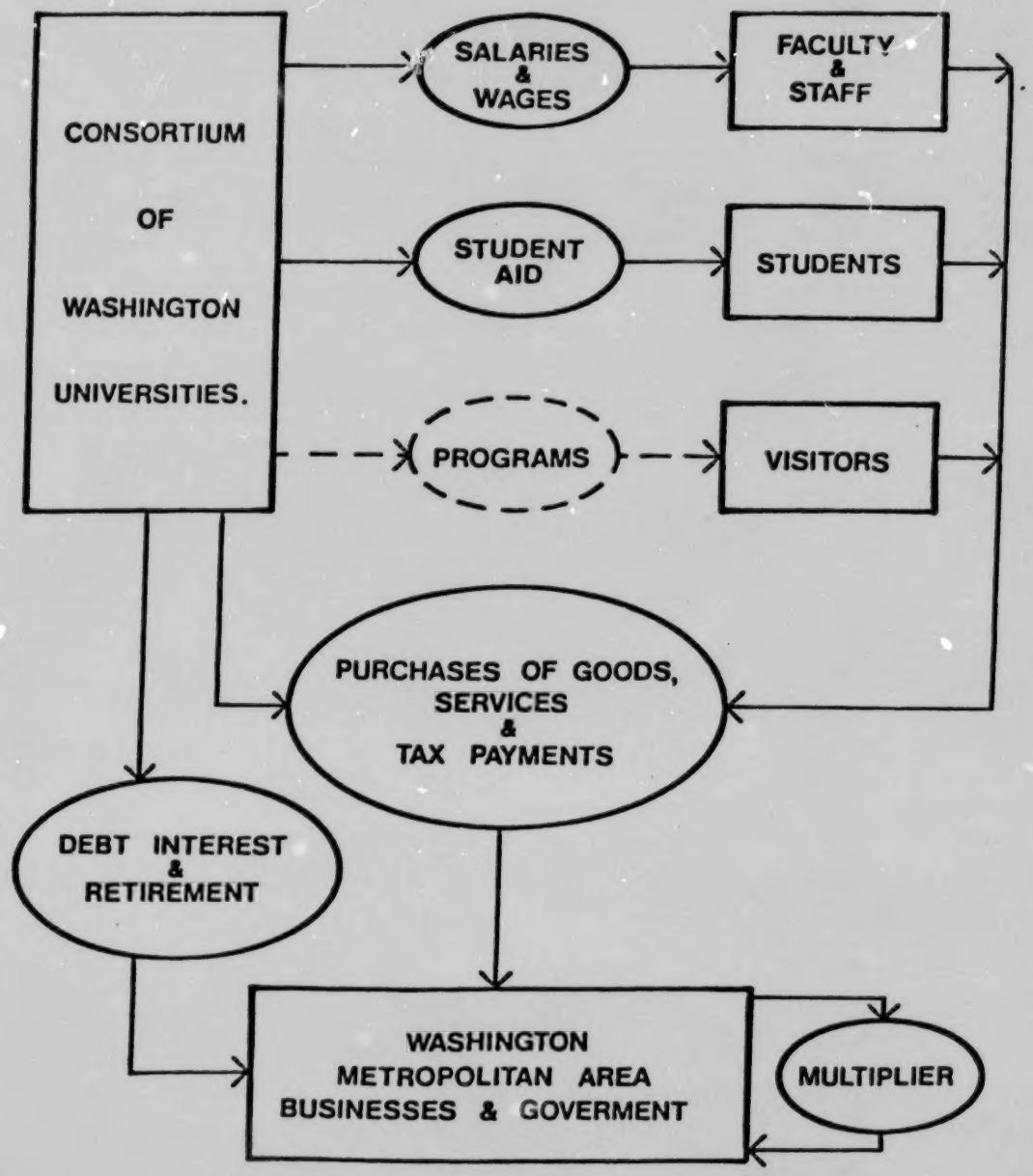

Fig. 1. OPERATIONAL AND CAPITAL EXPENDITURE CASH FLOW MODEL.

conferences, workshops and institutes. These visitors also purchase goods and services in the community and are subject to taxes.

The academic institutions of the Consortium purchase goods and services corporately for operational and capital purposes as well as pay interest on debt services and retire debt. The purchase of these goods and services from local businesses, the payment of taxes to various government entities and the payment of interest to local financial institutions produces a cash flow (or its equivalent) which is then circulated and recirculated through the community. This circulation of funds can be represented by an economic multiplier which represents the purchase of additional goods and services and the payment of taxes.

DATA AND ANALYSIS

Most of the data for this study was obtained from readily available institutional records and estimates derived from explicit assumptions. In a few cases sample surveys were required to achieve a reasonable assurance of a correct estimate. Financial data were taken from the official budgets or audited statements of the various institutions. Some categories of income and expenditure were reaggregated to make the data more amenable to analysis.

Table 1 presents data on enrollment and the geographical origin of full-time and part-time students belonging to the Consortium for the Fall 1980 semester. Of the 90,465 students (essentially all academic year residents of the District of Columbia, Maryland and Virginia), 57,512 or 63.6% of the total originate from the three political jurisdictions and 31,240 or 34.5% of the total are residents of the District of Columbia. These students pay a total of $217,419,000 in tuition and fees to the Consortium institutions.

TABLE 1 - SELECTED STUDENT DATA

STUDENT RESIDENCE	NUMBER ENROLLED	TUITION & FEES
District of Columbia	31,240	$ 45,295,000
Maryland	15,613	39,820,000
Virginia	10,659	32,368,000
Other	32,953	99,936,000
Total	90,465	$217,419,000

The number of faculty and staff and their place of residence is shown in Table 2. Of the 38,500 faculty and staff, 19,344 or 50.2% reside in the District of Columbia and 96.0% reside within the three political jurisdictions. A total of $29,109,000 of local income taxes (district and state) were withheld from faculty and staff for the 1980 year. Consortium faculty and staff who live in the District make up 6.1% of the labor force of those who live and work in the District.

TABLE 2 - SELECTED FACULTY AND STAFF DATA

FACULTY & STAFF RESIDENCE	NUMBER	LOCAL INCOME TAX WITHHELD
District of Columbia	19,344	$11,769,000
Maryland	11,255	12,861,000
Virginia	6,366	4,477,000
Other	1,535	2,000
Total	38,500	$29,109,000

The sources of operational funds for 1980-81 are shown in Table 3. Government agency funds are used primarily for the purchase of specialized services such as research and instruction and student aid. The vast majority of these funds come from federal government sources. Student tuition and fees and medical services provided to the general public provide other substantial sources of revenue.

TABLE 3 - SOURCES OF FUNDS FOR OPERATIONAL EXPENDITURES

Government	
Federal	$261,958,000
District of Columbia	61,534,000
Other	1,358,000
Sub-total	$324,850,000
Tuition & Fees	$217,420,000
Investments	11,616,000
Private Gifts & Grants	34,280,000
Auxiliary Enterprises	50,603,000
Medical Services	221,572,000
Other (includes sales & services)	24,300,000
Total	$884,641,000

Table 4 presents operational expenditures for the 1980-81 year. It is seen that salaries and wages comprise 66.5% of expenditures and account for the largest share of Consortium expenditures. Purchases of goods and services account for additional significant shares. Within these categories are large expenditures for various forms of energy because of the extensive physical plants of the academic institutions.

TABLE 4 - OPERATIONAL EXPENDITURES

Salaries, Wages & Fringe Benefits	$588,566,000
Purchases	117,839,000
Services	89,889,000
Taxes	4,546,000
Student Aid	45,057,000
Interest on Debt Service	14,598,000
Transfers for Capital & Other Purposes	24,146,000
Total	$884,641,000

Table 5 presents capital sources of funds for 1980-81. Approximately 40% of capital funds comes from government sources.

TABLE 5 - SOURCES OF FUNDS FOR CAPITAL EXPENDITURES

Gifts and Grants	
Government Agencies	$ 19,529,000
Private Sources	7,116,000
Debt Financing	
Government Sources	10,475,000
Private Sources	13,858,000
Operating Budgets	23,460,000
Total	$74,438,000

Capital expenditures by function are listed in Table 6. It is seen that 74% of capital funds are used for physical facility construction and renovation.

TABLE 6 - CAPITAL EXPENDITURES

Construction	$54,905,000
Capital Purchases	14,509,000
Debt Retirement	5,024,000
Total	$74,438,000

Capital investment for the decade from 1971-72 to 1980-81 is shown in Table 7 for construction and capital purchases. The average yearly expenditure was approximately $62,000,000. Hence, expenditures for the 1980-81 year are typical (within 10%) of the average for the decade.

TABLE 7 - TEN YEAR LOCAL CAPITAL INVESTMENT

1971-72	$ 71,006,000
1972-73	36,224,000
1973-74	28,400,000
1974-75	107,497,000
1975-76	38,344,000
1976-77	46,227,000
1977-78	68,798,000
1978-79	95,904,000
1979-80	55,860,000
1980-81	69,415,000
Total for the Decade	$617,675,000

Table 8 presents spending generated by the Consortium institutions in the District of Columbia, Maryland and Virginia. It is seen by comparing this data to Table 4 that 99.3% of salaries and wages go to residents of the District of Columbia, Maryland and Virginia, while 63.0% of the purchases of goods and 73.1% of the purchases of services is directed to the three jurisdictions.

TABLE 8 - INSTITUTIONAL-GENERATED LOCAL SPENDING (Thousands)

	D.C.	MD.	VA.	TOTAL
Operating				
Salaries, Wages & Fringe Benefits	$273,873	$185,880	$124,630	$584,383
Purchases	30,578	24,184	19,468	74,230
Services	37,308	14,384	14,060	65,752
Taxes	4,472	38	35	4,545
Aid to Area Students	9,003	7,403	5,267	21,673
Interest on Debt Service	14,598			14,598
Capital				
Construction	54,905			54,905
Capital Purchases	14,509			14,509
Debt Retirement	5,024			5,024
Total	$444,270	$231,889	$163,460	$839,619

Student generated local spending is presented in Table 9. Students generate $175,659,000 of expenditures and visitors $56,992.000.

TABLE 9 - STUDENT-GENERATED LOCAL SPENDING (Thousands)

Living Expenses	
Full-time	$158,476
Part-time	17,183
Visits	
By Applicants & Families	16,737
By Families of Students	30,515
Conference & Institute Participants	9,740
Total	$232,651

The total amount of institutional (operational and capital) and student generated spending in the area or the direct economic impact amounts to $1,072,270,000. The economic contribution or impact of the Consortium on the local area is the product of the direct economic impact and the economic multiplier.

THE ECONOMIC MULTIPLIER

Calculation of the economic multiplier can be quite complicated requiring massive data if a fully disaggregated input-output model is used. Caffrey and Issacs recommend a multiplier within the range of 1.2 to 1.5 for university economic impact studies. Table 10 presents a listing of some economic impact studies and the economic multipliers used in these studies. It is seen that the value of the multiplier ranges from a low of 1.4 to a high of 4.35. Based upon an analysis of these values from the perspective of the academic institution and the community and also discussions with Solomon who noted that although there is no stated multiplier for the Washington metropolitan region, comparing the region to other regions, it appears that the use of a value within the range of 1.4 as used in this analysis is a conservative estimate of the economic factor.

TABLE 10 - ECONOMIC IMPACT MULTIPLIERS

INSTITUTION	YEAR	MULTIPLIER
University of Florida	1970	1.4
Wisconsin State University	1970	2.0 - 2.3
University of Alabama	1971	4.35
Eastern Kentucky University	1971	1.75
University of Pittsburgh	1972	2.0
Georgia State University	1976	1.48
Independent Colleges & Univ. of New York	1976	2.0
Canisius College	1977	2.7
Independent Colleges & Univ. of Mass.	1980	1.5

Hence the total economic impact is estimated to be over $1,500,000,000. Comparing this impact to the impact of other sectors of the economy, the Consortium is the largest contributor to the District's economy excluding the federal and local government.

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THE DESIGN AND IMPLEMENTATION OF AN EVENING STUDENT SURVEY: METHODOLOGICAL ISSUES AND PRACTICAL CONSIDERATIONS

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OVERVIEW

A broadly-based function of institutional research is "to provide information which supports institutional planning, policy formulation, and decision making (Saupe, 1981)." In this regard, survey research can be useful in planning and implementing a variety of programs and services at postsecondary institutions. The findings can be particularly meaningful if the impetus for survey research is internally motivated (Kells, 1981), and if results are presented in a format that is "understandable to decision makers (Sadler, 1980)." In light of these practical considerations, this paper focuses on the development and administration of the questionnaire, the analysis of data, and the communication of findings.

DESIGN AND ADMINISTRATION OF THE SURVEY

In response to a recent increase in evening student enrollments at Jersey City State College, a public, four-year institution, managerial administrators expressed an interest in assessing the needs of the evening student population. In view of the fact that the evening program serves a diverse, nontraditional student population, the relevance of survey packages offered by various test publishers was judged to be limited. Consequently, the decision was made to develop and utilize a local instrument in order to assess student concerns with various academic and nonacademic issues.

In order to identify pertinent issues for each student cohort, i.e., graduate students, matriculated and non-matriculated undergraduates, the Director of Institutional Research met with department chairpersons and administrators representative of Academic Affairs, Finance, and Student Services. Suggestions for relevant items were incorporated in the development of a questionnaire which could be completed within a relatively short time period.

The questionnaire was comprised of 28 objective items and one open-ended question, included for student comments. Twelve of the objective items assessed academic and demographic characteristics; 16 items, various academic and nonacademic services provided for the evening students. Nearly all the service-oriented items were scored on a five-point, Likert scale, which facilitates scoring by an optical mark reader or manual coding of responses. The questionnaire was pretested and several item revisions were made.

In view of the fact that mailed-in questionnaire returns, even with repeated efforts, have been found to be relatively low, the decision was made to administer the questionnaire to the students in their classrooms. Administrative support was obtained, and all academic departments received prior notice of the time period during which the survey would be conducted. In order to ensure a representative sample, classes were selected to reflect the proportion of evening courses offered by the various academic departments at the lower and upper undergraduate levels as well as the graduate level. The questionnaire was administered to 1275 undergraduate and graduate students during a one-week interval at mid-semester. Students were requested to complete the questionnaire anonymously and, for students enrolled in more than one class in which the survey was conducted, to fill out only one questionnaire. All students completed the questionnaire within

five or ten minutes, so that disruption of instructional time was minimal.

FINDINGS

Responses to the student background items were compiled. Appropriate tabulations and cross tabulations were computed to provide data on the students' schedules, course load, status, major, age, sex, employment patterns. Comparisons between the evening students and the general college population indicated similar distributions for sex and major area of study. However, the evening students were more likely to attend part time, to be considerably older than the traditional day student, and to be employed on more than a half-time basis.

Responses to the service-oriented items were tabulated for the total evening student sample. Data indicated that the most important issues focused on security, the establishment of an Evening Student Office, adjustments in the evening course schedules, and the extension of various services. Additionally, for the Likert-scale items, chi-square analyses were conducted to determine if there were significant differences between various subgroups, i.e., full-time and part-time students; undergraduates and graduate students. Results of these analyses are presented in Table 1.

Table 1A

Analysis of Student Attitudes Toward the Evening Program
By Status and Class Level

Item	Response: Not Important N	Not Important %	Neutral N	Neutral %	Important N	Important %	x^2
Advisement After 7 PM							
Status							8.22*
Full-Time	67	16%	96	23%	251	61%	
Part-Time	135	16%	140	16%	571	68%	
Class Level							22.40***
Undergraduate	118	13%	140	17%	584	70%	
Graduate	73	21%	81	24%	186	55%	
Food Services After 7 PM							
Status							21.40***
Full-Time	98	24%	109	26%	206	50%	
Part-Time	306	36%	220	26%	320	38%	
Class Level							5.16
Undergraduate	249	30%	222	26%	370	44%	
Graduate	121	35%	90	27%	129	38%	
Book Store Hours After 7 PM							
Status							.55
Full-Time	28	6%	52	13%	334	81%	
Part-Time	66	8%	101	12%	679	80%	
Class Level							5.52
Undergraduate	53	6%	96	12%	693	82%	
Graduate	31	9%	49	14%	260	77%	
Additional Security							
Status							1.64
Full-Time	12	3%	31	7%	370	90%	
Part-Time	14	2%	62	7%	771	91%	
Class Level							11.90**
Undergraduate	17	2%	77	9%	748	89%	
Graduate	5	2%	12	3%	323	95%	
Student Lounge							
Status							14.53***
Full-Time	35	8%	94	23%	284	69%	
Part-Time	125	15%	221	26%	501	59%	
Class Level							.60
Undergraduate	105	13%	208	25%	529	62%	
Graduate	48	14%	81	24%	211	62%	

Table 1B

Item	Response: Not Important N	Not Important %	Neutral N	Neutral %	Important N	Important %	x^2
Additional Library Staff							
Status							4.11
Full-Time	26	6%	87	21%	298	73%	
Part-Time	82	10%	186	22%	579	68%	
Class Level							.62
Undergraduate	72	9%	176	21%	592	70%	
Graduate	25	8%	76	22%	239	70%	
Student Activities							
Status							97.49***
Full-Time	90	22%	144	35%	177	43%	
Part-Time	363	43%	313	37%	171	20%	
Class Level							77.52***
Undergraduate	258	31%	299	36%	283	33%	
Graduate	152	44%	134	39%	54	17%	
Use of Gym/Pool							
Status							66.73***
Full-Time	75	18%	130	32%	207	50%	
Part-Time	324	38%	273	32%	252	30%	
Class Level							41.99***
Undergraduate	218	25%	266	32%	359	43%	
Graduate	144	42%	111	33%	85	25%	
Courses in Sport & Leisure							
Status							45.15***
Full-Time	79	19%	137	33%	196	48%	
Part-Time	302	36%	280	33%	265	31%	
Class Level							51.60***
Undergraduate	209	25%	259	31%	373	44%	
Graduate	139	41%	129	38%	72	21%	
Evening Student Council							
Status							49.44***
Full-Time	96	24%	148	36%	168	40%	
Part-Time	326	39%	326	38%	196	23%	
Class Level							39.53***
Undergraduate	241	29%	313	37%	289	34%	
Graduate	143	43%	138	41%	58	16%	
Two Courses in One Evening							
Status							1.96
Full-Time	40	9%	95	23%	275	68%	
Part-Time	78	9%	168	20%	598	71%	
Class Level							5.11
Undergraduate	88	11%	179	21%	574	68%	
Graduate	21	6%	71	21%	244	73%	

Results indicate that full-time students expressed significantly greater interest than part-time students in various student activities and services. Part-time students showed significantly greater concern with evening course schedules and coordination of academic services. As may be expected, undergraduates showed significantly greater interest than graduate students in various student activities.

Additionally, of the 1275 students who completed the questionnaire, 35% responded to the open-ended item. The students' comments focused, primarily, on the need for additional security, appropriate course offerings at convenient hours, and the extension of academic services.

COMMUNICATION AND IMPLEMENTATION OF FINDINGS

A report was prepared and was furnished to managerial administrators, department directors and chairpersons at the College. In the report, the assistance provided by the faculty and staff was acknowledged, and the design and implementation of the survey were described. Data were presented in tabular form followed by a summary of findings in the text. Additionally, student concerns with various services were ranked and presented in descending order. Responses to the open-ended item were analyzed, and a sampling of responses was reported verbatim in each of seven categories. Although few new issues were cited in responses to the open-ended item, the qualitative data served to highlight the information provided by the objective measure. A grand summary, which focused on salient issues to be considered by policy makers at the institution, was also included.

Findings were implemented in several ways. In response to the open-ended item, some students commented favorably about the evening program and the College in general. These citations were forwarded to the Director of Admissions, who included some of the comments verbatim in an Admissions Office publication. Additionally, in response to survey findings, decisions

Table 1C

Item	Response: Not Important N	Not Important %	Neutral N	Neutral %	Important N	Important %	x^2
Courses Meeting Once a Week							
Status							8.25*
Full-Time	18	5%	71	17%	321	78%	
Part-Time	33	4%	99	12%	712	84%	
Class Level							2.23
Undergraduate	34	4%	125	15%	680	81%	
Graduate	14	4%	39	12%	284	84%	
Courses at 10 PM							
Status							10.72**
Full-Time	269	66%	80	19%	62	15%	
Part-Time	594	70%	174	21%	76	9%	
Class Level							27.51***
Undergraduate	533	63%	192	23%	114	14%	
Graduate	267	79%	51	15%	20	6%	
Evening Student Office							
Status							6.07*
Full-Time	17	4%	51	13%	327	83%	
Part-Time	38	5%	70	8%	724	87%	
Class Level							.78
Undergraduate	37	5%	76	9%	706	86%	
Graduate	15	4%	36	11%	280	85%	

* $p < .05$

** $p < .01$

*** $p < .001$

were made to institute various changes, e.g., improved lighting and other security measures, adjustments in evening course schedules, provisions for coffee and snacks in the student lounge. These changes were relatively easy and inexpensive to implement.

Overall, the survey provided the institution with relevant information about the needs and concerns of the evening student constituency. Particularly in view of the fact that institutional support for the survey was obtained, the findings were reviewed and utilized to enhance the services provided for the evening students at the College.

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HUMAN RESOURCE PLANNING

A Model for Establishing and Projecting Attrition Rates Among the Non-Instructional Staff of an Academic Institution

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As state budget directors and college comptrollers look for ways to control and diminish the cost of operations of postsecondary institutions, it is evident that wages, salaries and benefits are a critical factor in that cost; indeed, these expenses generally account for 70 to 80 percent of the institutional budget. To the extent that efforts at predicting institutional human resource needs are sound and creditable, colleges will be able to exert more effective control over their staffing decisions and consequently, over their budgets.

STOCK AND FLOW MODELS

Colleges and universities have not ignored the wisdom of developing staffing projection models for faculty. Several studies have examined the normal attrition which occurs among faculty through retirement, termination, non-renewal and resignation and have tested the effect of policy variables related to hiring, promotion and tenure decisions on this attrition rate (Bloomfield, 1977; Hopkins, 1974; Hopkins and Massey, 1981; Hopkins and Schroeder, 1977; Oliver, 1969; Young and Almond, 1961). Curiously, little attention has been given to determining and projecting the hiring and attrition pattern among another significant employee sector in higher education, the non-instructional staff. It is a sector which slightly exceeds in number the faculty at the comprehensive four-year public college which was the subject of this study, and it accounts for the expenditure of a relatively large proportion of the personal service budget. Beyond these quantifiable factors, however, lie the qualitative considerations which make staffing projection and planning efforts so critical. To the non-instructional staff largely falls the responsibility for maintaining what is euphemistically referred to as "the quality of life" on campus--counselors and caretakers, laboratory technicians and bursar clerks--all make critical contributions to the support

of the academic environment. This study does not attempt to develop staffing ratios for these support functions; its purpose rather is to bring to the attention of administrators the fact that a comprehensive human resource planning program must take into account non-instructional as well as faculty staffing.

Theoretical Background

The statistical analysis of human resource systems was first approached systematically through the use of modelling techniques during the 1940s and developed rapidly with the widespread emergence of computer technology in the 1960s. These early studies demonstrated that, in general, propensity to leave decreases with age and length of service, is higher for women than men and decreases with increasing salary, status or skill (Silcock, 1954; Hedberg, 1961). Of these, length of service appears to be the most significant factor (Bartholomew and Forbes, 1979).

The next evolutionary step in the development of human resource planning models moved beyond the measurement and projection of attrition rates and concerned itself with the construction of transition models depicting systems of stocks and flow (Young and Almond, 1961; Gani, 1963; Haire, 1968; Mahoney, 1977). The stock and flow theory proposes that human resource systems of organizations can be described in terms of stocks of human resources available in various categories at a point in time. Variations within these groupings are measured in terms of the flow of people from one category to another through promotions, hires, resignations or terminations. Movement is measured through a comparative analysis of the composition of each group at two points in time (T, T-1); the statistical approach most often used in this analysis is the Markov chain. For colleges and universities, standard stock and flow models have obvious applicability when determining the rate of movement among faculty ranks. The model, however, presents certain difficulties when applied to the non-instructional staff, problems which result primarily from its emphasis upon promotion or upward movement through a hierarchical system.

A variation of the stock and flow model--the cohort flow model--provides the flexibility needed in this study. This statistical technique models personnel flows in terms of hiring, persistence rates and attrition by examining a given cohort longitudinally through a specified period (Grinold and Marshall, 1977; Hopkins and Massey, 1981). While the Markov chain method most commonly used in stock and flow analysis requires less data than the

cohort flow model and gives an adequate depiction of staffing distribution at a specific time, there is evidence that it is most effective when used for short-range forecasting during periods of relative stability in the organization. The cohort flow model has been found to provide more accurate projections for longer range forecasts and under less stable organizational conditions (Marshall, 1973).

The theoretical approach of this study is further informed by the statistical technique of renewal modelling which has particular relevance for postsecondary education today. In the standard stock and flow models, attrition and promotion flows are analyzed to predict expansion in category size. In effect these are "push" flows which tend to force the growth of the organization. Renewal modelling takes into account the static situation in which the growth rate is zero or negative. Since hiring or promotion can only take place to fill vacancies, a "pull flow" is created. The analysis is concerned with determining and projecting the attrition flow which may be said to drive the system by creating the "pull" through which promotion or hiring can occur (Bartholomew, 1973; Bartholomew and Forbes, 1979).

METHODOLOGY

The model employed in this study is cohort oriented, that is, it examines the relevant characteristics of a group and traces that cohort year by year into the future. The variables examined for each individual included in the study are appointment type, date of hire, date of permanent appointment, date and reason for termination of service, and date of birth. The model uses probabilities based upon historical evidence to determine rates of resignation, retirement, non-renewal, permanent appointment and hiring.

For purposes of this study, the critical population, the non-instructional staff employees, was divided into three cohorts--non-teaching professional (NTP), clerical and service/maintenance employees. These divisions were based primarily on obvious distinctions in job responsibilities and contractual provisions governing employment. The professional group is similar to faculty in that, when hired, they are granted a term appointment and are periodically reviewed for renewal or termination of that appointment. At the beginning of the seventh year of continuous service, the employee is advised of either permanent appointment or termination. The terms and conditions of employment for the clerical and service/maintenance groups are governed by New York State Civil Service regulations and differ markedly from those which pertain to the professional staff. Within these groups, movement from probationary to

permanent status occurs almost routinely and attrition through appointment termination is relatively rare.

The data for this study were provided by the Personnel Data System, a comprehensive university-wide data base used for tracking personnel and payroll information. It contains approximately 100 pieces of information for each employee and has been maintained at our campus since 1976, thus making it possible for us to create the historical file which was the basis for this study. This historical file provided an account of each cohort's characteristics and employment activities for the calendar years 1979, 1980 and 1981.

Professional Employees

Examinations of preliminary data immediately indicated that within the professional (NTP) cohort two distinct subgroups could be identified: (1) individuals with temporary appointments, and (2) individuals with permanent appointments. The distinctions between these two groups centered primarily around age and the rate and method of attrition. Table One illustrates those differences.

TABLE ONE

AGE AND ATTRITION DIFFERENCES

		Permanent Appointments	Temporary Appointments
AGE	Mean	45	35
	Median	44	32
ATTRITION RATES	Retirement	variable	0.0%
	Non-Renewal	--	2.6%
	Other Attrition	2.2%	9.0%

As might be expected, retirement is an age-dependent variable. Temporary employees are hired at a relatively young age; as a result, they become permanent employees, are not renewed or resign before retirement becomes a critical factor. Due to the significant differences noted in Table One, separate algorithms for projecting future employment levels were developed for each group:

Permanent NTPs

$$NP_y = \left[NP_{y-1} + AP_y\right] - \left[RP_y + (NP_{y-1})rrP\right] \qquad (1.1)$$

NP_y = total number of permanent NTPs at the end of the year y

NP_{y-1} = total number of permanent NTPs at end of the year y-1

AP_y = new permanent NTPs . . . a function of the number of temporary NTPs eligible for permanent status

RP_y = total number of retirements (see Table Two)

rrP = attrition rate

Temporary NTPs

$$NT_y = \left[NT_{y-1} + HT_y\right] - \left[AP_y + (NT_{y-1})nrT + (NT_{y-1})rrT\right] \quad (1.2)$$

NT_y = total number of temporary NTPs at the end of year y

NT_{y-1} = total number of temporary NTPs at the end of year $_{y-1}$

HT = the number of new hires

nrT - non-renewal rate

rrT = resignation rate

The total number of NTPs employed in a given year is then simply the sum of NP and NT.

Upon establishing our two algorithms, the first task became the determination of historical rates and levels for our variables. Tables Two and Three present these rates and levels and describe how they were obtained.

Table Four displays the nature and composition of our non-teaching professionals should current policy be extended to the year 1984. These projections are the results of equations (1.1) and (1.2), the rates and levels are those set forth in Tables Two and Three

TABLE FOUR

NTP EMPLOYMENT LEVELS TO 1984

	PERMANENT NTPs			TEMPORARY NTPs		
	Retirement	Other Attrition	Total Employees	Non-Renewals	Other Attrition	Total Employees
1982	1	1	52	2	6	64
1983	-	1	59	2	6	58
1984	4	1	61	2	5	54

Several policy issues are raised by these projections. Among the most obvious is the effect of the continuation of an extremely lenient policy on the granting of permanent appointment, a policy which will result, within two years, in a professional cohort which has a majority of permanent appointees. The implications of such a situation are clear in terms of

salary costs, institutional flexibility in response to new program needs or potential staffing reductions. Beyond these issues, there is a question of the rigor and validity of an evaluation process which results in the almost universal granting of lifetime appointment.

Clerical and Service/Maintenance Employees

The guidelines for the development of clerical and service/maintenance models are essentially the same as for our non-teaching professional flow model. Here, however, because of the nature of the conditions of employment, the model becomes much less complicated. Management is extremely limited in the kinds of actions it may take to manipulate flows within this group. Essentially, once an individual has been hired, there is very little likelihood that management will initiate actions to remove him from the payroll. Attrition usually occurs through retirement and resignation, much less frequently through probation termination.

Two major cohorts, clerical and service/maintenance employees, were identified within the general heading of classified employees. The primary demographic difference between the two groups was age--for clerical employees, the average age was 39, while for the service/maintenance staff, the average age was 49. It was felt that this difference would make a significant impact on retirement rates, therefore, the two groups were modelled separately. The algorithm for both groups is:

$$N_y = \left[N_{y-1} + H_y\right] - \left[R_y + (N_{y-1})rr\right] \qquad (2.1)$$

N_y = total number of employees at the end of year y

N_{y-1} = total number of employees at the end of year y-1

H_y = total number of new hires

R_y = total number of retirements

rr_1 = attrition rate (based on historical patterns includes all attrition other than retirement)

Tables Five and Six present historical rates and levels for our algorithm. Also included in these tables are descriptions of the procedures used to obtain these rates and levels.

Table Seven displays the employment levels of our clerical and service/maintenance employees should current policy be extended. The projections are results of equation (2.1), the rates and levels are those developed in Tables Five and Six.

TABLE TWO

MANPOWER ACCOUNTS FOR PERMANENT NTP's 1979-81

		1979	1980	1981	Derivation of Historical Rates
Total No. of Perma-nent NTP's	Beginning of Yr.	38	38	49	
	End of Yr.	38	49	50	
NEW		2	12 (13 eligible)	4 (4 eligible)	The number of new permanent NTP's is a function of temporary NTP's eligible for such status. Essentially,historical data indicates that all those eligible are granted permanent status.
Retirements		2	1	1	
		retire-ment ages 63,64	-	retire-ment age 48	Median retirement age is 63.
Other Attrition	N	-	1	2	Mean attrition rate 2.2%.
	%	0.0	2.6	4.1	

* *

TABLE THREE

MANPOWER ACCOUNTS FOR TEMPORARY NTP's 1979-81

		1979	1980	1981	Derivation of Historical Rates
Total No. of Tempo-rary NTP's	Beginning of Yr.	81	83	69	
	End of Yr.	83	69	66	
New Hires		12	9	10	Mean number of new hires 10.3.
Non-Renewal	N	3	1	2	Mean non-renewal rate 2.6%.
	%	3.7	1.2	3.0	The data indicates that non-renewal tends to occur during the 5th year of service.
Other Attrition	N	5	9	7	Mean attrition rate 9.0%.
	%	6.2	10.8	10.1	The data indicates that "other attrition" tends to occur during the 4th year of service.
To Permanent Appointment		2	13	4	All those eligible for permanent appointment are granted such status.

* *

TABLE FIVE

MANPOWER ACCOUNTS FOR SERVICE-MAINTENANCE EMPLOYEES 1979-81

		1979	1980	1981	Historical Rates
Total Employees	Begin.Yr.	189	197	195	
	End of Yr.	197	195	196	
NEW		23	14	17	mean number of new hires 18
RETIRED		8	5	8	
Mean age at retirement		60	60	60	mean retirement age 60
ATTRITION	N	7	11	8	
	%	3.7%	5.6%	4.1%	mean attrition rate 4.5

* *

TABLE SIX

MANPOWER ACCOUNTS FOR CLERICAL EMPLOYEES 1979-81

		1979	1980	1981	Historical Rates
Total Employees	Begin.Yr.	191	187	182	
	End of Yr.	187	182	180	
NEW		21	18	31	mean number of new hires 23
RETIRED		5	5	7	
Mean age at retirement		60	60	63	mean retirement age 61
ATTRITION	N	20	18	26	
	%	10.5%	9.6%	14.3%	mean attrition rate 11.5%

TABLE SEVEN

CLASSIFIED EMPLOYMENT LEVELS 1982-1984

	CLERICAL			SERVICE/MAINTENANCE		
	Retirement	Other Attrition	Total	Retirement	Other Attrition	Total
1982	8	21	174	20	9	185
1983	11	20	166	22	8	173
1984	4	19	166	20	8	163

This example shows that high retirement levels coupled with low hiring rates will tend to reduce the work force in these categories over the next several years. Policy issues to be considered include a decision to increase the traditional hiring rate to prevent depletion of these ranks, or a determination that this natural attrition may be used to offset potential budget reductions.

CONCLUSION

The examination of historical staffing patterns among specific employee cohorts and the projection of these patterns establishes a quantifiable base through which decisions on the handling of human resources can be formed. The existence of a reliable system for recording and retrieving personnel transactions--both current and historic--is critical to this process. The reliability of the projections is significantly enhanced when the cohort under study is traced for a multi-year period.

While cohort models tracing faculty flow are fairly common, there has been relatively little application of these stock and flow techniques to the study of non-instructional staffing patterns. Algorithms have been tested in this study which are similar to those used for faculty models but which eliminate consideration of the movement brought about by promotion in rank and the granting of academic tenure. Analysis of the data revealed by these algorithms enables administrators to consider for non-instructional staff such issues as the natural attrition and replacement rates, compensation costs for a maturing work force and policy issues on the granting of permanent appointment. Any of the variables may be manipulated to test the results of changes in current personnel practices and policies.

The inclusion of projections on non-instructional staffing patterns in human resource planning efforts adds to the comprehensiveness of the approach

and portrays more accurately the actual and projected configuration of the work force. The result of this may be at least a partial refocusing of administrative concern from one which concentrates exclusively on the faculty cohort, to a more balanced and inclusive view of the commitment of human resources in our academic institutions.

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Developing a Composite of Institutional Reputation and Assessing its Impact upon Selected Student Behaviors

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Introduction

New Paltz College is a four year, state operated postsecondary institution, awarding bachelors and masters degrees in Education, the Fine and Performing Arts and the Liberal Arts and Sciences. During the late 1970's the college experienced a precipitous decline in headcount enrollments, from a reported 8892 in 1975 to a level of 6747 in 1978; all projections indicated continual and gradual decline. This decline did not appear to be the function of declining college bound populations within the college's feeder regions but rather, attributed to a complex net of immediate institutional and student population behaviors. Since 1978, the institution has continually increased the size and quality of the student population. The Fall 1982 enrollment approached 7500 headcount students, with the mean high school average of the recent entering class approximately five percentage points higher than those entering in 1978. This reversal in enrollment was the function of an institutional-wide effort to identify institutional weaknesses associated with enrollment behavior, and to strategically and immediately modify the institution where enrollment would be most effected.

Since resources were not unlimited, it was critical that existing resources be allocated and reallocated to activities which would effectively contribute to positive enrollment outcomes. As such, each programmatic decision would require justification on the basis of information that might substantiate effectiveness. It thus became a college-wide effort to examine the role which the following had upon the dynamics of enrollment:

(1) Academic program mix
(2) Relative position in the competitive market place
(3) Sources of information students use in learning about colleges and quality of information thereof
(4) College characteristics perceived as desireable and undesireable
(5) Admissions activities
(6) Institutional reputation

This paper will present an approach to assessing the role of an institutional reputation within the dynamics of enrollment. Specifically, the purposes of this paper are:

(1) To present an approach to identifying indicators for establishing a comprehensive composite of a post-secondary institution's reputation

(2) To share the data collection instrument and data gathering experiences of one public postsecondary institution

(3) To present a methodology for establishing and presenting the relative presence of institutional reputational indicators

(4) To present a methodology for establishing and presenting competitive advantages and disadvantages evident within the institutional reputation

(5) To present a methodology for establishing and presenting the association of reputational indicators within selected student behaviors

(6) To present a methodology for illustrating the market posture of the institution to various audiences.

I. Developing a Composite of Institutional Reputation

Initially, a formal committee was established to identify reputational images that might contribute to student application and persistance behaviors. This committee, designated as an institutional research advisory committee, was representative of a broad segment of the college community.

Individuals participating in the advisory committee represented the following specific college constitutiencies:

Orientation and Advising Office
Freshmen and Transfer Admissions Office
College Relations and Public Affairs Office
Student Affairs Office
Institutional Research Office
Faculty Government
Financial Aid Office
Student Government
President's Office

The research advisory group met weekly through the spring semester of 1979. During that time literally hundreds of hypothetical college reputations were scenarioed. Two items became evident (a) there was no single item which could satisfactorly measure reputation and (b) there were more reputational items generated by the committee than could reasonably be

placed on a research instrument. It was thus established that an institutional reputation be considered a function of many indicators which could theoretically provide a composite picture of how groups perceive an institution.

Further, the research advisory group deemed it prudent to limit the number of reputational indicators to fifteen. Items were selected from the hundreds of possibilities through a series of group compromise and consensus building activities. A fundamental outcome of this process was the articulation of institutional concerns which could be addressed by various institutional actors.

Exhibit I presents the indicators which are currently used to build the reputational composite. These indicators are framed within statements appearing in the data collection instrument. Each statement is constructed as either a positive or negative institutional goal. Respondents are asked to either agree or disagree that the qoal is applicable. The reader should observe that information is gathered regarding both the subject institution and the students' other highest college choices. The name of the other college choice and its place within the hierarchy of college alternatives is gathered in an earlier section of the reseach instrument.

The research advisory group having successfully established the content of the first research instrument was dismissed. Today, reputational indicators are reviewed by the Presidental cabinet on the basis of:

(1) the clarity and value of the information received from the previous administration of the questionnaire and,

(2) new themes which may emerge from the open comment section of the questionnaire.

A note on reviewing open comments

As each completed questionnaire is received, student interns check to determine if the survey was properly completed, and prepare the document for keypunching by the staff of the Computer Services Center. In addition, interns also type the respondents' written comments into the computer. Each comment is "tagged" with a predetermined label that can be recognized by the computer at a later time. There are fifty (50) labels which have been developed during the administration of the project over the past three years; the labels essentially can "tag" a comment as to whether it is about a very specific item relative to the institution; examples include: college size, attractiveness, academic standards, mail received, respect of graduates and the college town. Quite literally, with computer recognized labels, the computer can organize what prospective students tell us, beyond what we ask thorough questions in a very structured survey. At the completion of the data collection cycle comments which cannot be tagged are examined and compete for a place as one of the 15 priority reputational indicators.

II. Data Gathering Experiences

There are four selected student groups that have been established for sampling. They are:

(1) No Show Acceptances
(2) New Entrants
(3) Currently Enrolled Undergraduates
(4) Alumni

Information for both the no show acceptances and the new entrants is obtained during the institution's annual survey of a sample of accepted applicants. Currently enrolled undergraduates are sampled in the spring of each semester. The reputational indicators accompany an annual survey of student opinions about the college. Finally, reputational indicators accompany an annual survey of alumni who graduated from the college one, five, ten, and fifteen years ago. It thus becomes possible to establish differences in reputation from prospective, current and past students.

New Entrant Data Gathering

Approximately 20 percent or 1,000 accepted applicant students are selected for purposes of surveying. Each selected student receives a letter from the President requesting participation in the research project, a questionnaire, and a self-addressed stamped envelope. If a participant has not returned the questionnaire in five weeks, a follow-up letter from the Director of Institutional Research and a different colored questionnaire is mailed to the participant. Experience demonstrates that this method of data collection provides a response rate of approximately 35 percent. This is viewed as particularly good considering that the majority of the respondents will have chosen to attend other postsecondary institutions.

Accomodating for Sample Bias

Before statistical analysis of the data, examinations are performed to determine if the returns are representative of the population. Tests are conducted to determine if the sample is biased by geographic market segment and by enrolling behavior of the accepted applicant population. The data collection experiences of 1979, 1980, and 1981 have demonstrated that large sampling differences occur when the same population is viewed by attendance behavior. Data collection efforts result in larger proportions of attending applicants then is evident in observed data.

With the sample biased in terms of accepted applicant enrollment behavior, it becomes necessary to appropriately modify the data, such that the distribution of the sample population mimics the distribution

of the observed population. The sample distribution is weighted through the use of the weighting option available in the Statistical Package of the Social Sciences.

Similar data gathering efforts are in practice for obtaining current and past student attitudes. Approximately 1,000 currently enrolled undergraduates are surveyed annually; this population has a 40 percent response rate. The population of alumni from the classes of one, five, ten, and fifteen years ago are surveyed, they also bear an approximately 40 percent response rate.

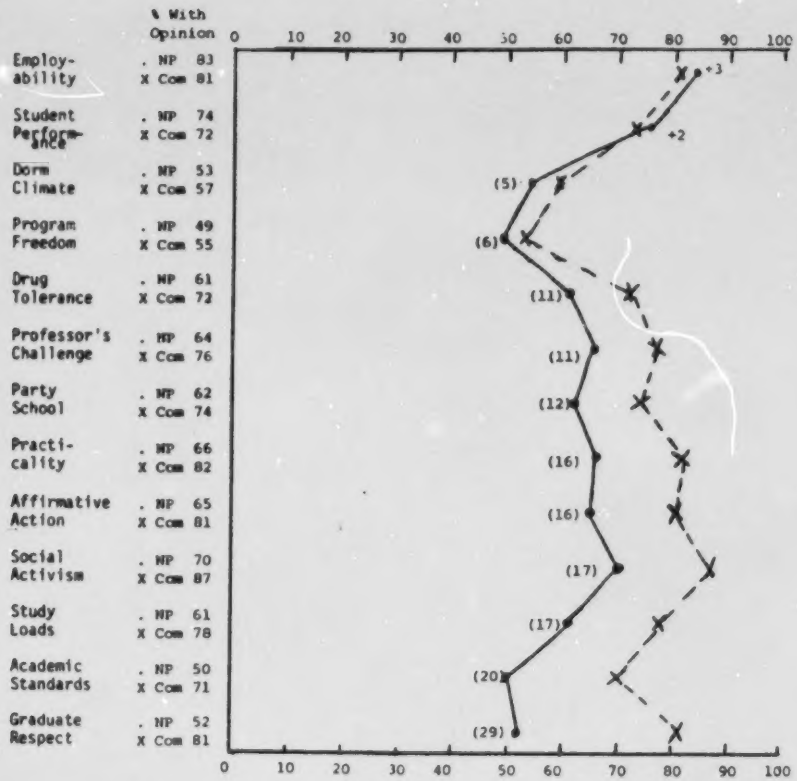
III. Market Penetration and Competitive Advantage

Having established a data base, we may now proceed with analysis. The first item of interest is to determine the hierarchical dominance of one reputational indicator over another. Specifically, we may examine the data to determine the relative awareness which the sampled population has regarding each indicator. This can be expressed in terms of the simple percentage of respondents who indicated agreement or disagreement with the item. Respondents are provided with the opportunity to claim that they do not have an opinion. We may thus rank order the variables according to the extent to which opinions are expressed.

Operationally, the percentage of respondents expressing an opinion may serve as a definition of market penetration. Since demographic data on the repondents is collected, we may disaggregate the total sample into selected categories. It is a practice to present the variations of opinions by geographic market segment and by the student high school average of entering freshmen, and by the category of student surveyed. The possibilities for disaggregated views of the data are limited only by the demographic characteristics collected and associated with each respondent record, and by the size and bias associated with the various demographic cells of the sample. To provide for very specific analysis, it is recommended that the survey data be merged and linked to admissions files, and that the sample be large, stratified by predetermined demographic variables, and random. Our experience to date indicates that such preventative techniques generally provide for a sample richness that can address most Ad Hoc levels of institutional concern.

Exhibit II: One Method of Presenting Penetrative Advantage and Disadvantage Indices

Freshman Awareness of Reputational Indicators for New Paltz Relative to Institutional Competitors



*For illustration purposes only, variable names are scrambled to maintain the confidentiality of the findings.

Exhibit I

THE COLLEGE AT NEW PALTZ
State University of New York

1 2 3 | 4 5 6 7 8 9 10 11 12

COLLEGE SELECTION SURVEY FOR STUDENTS *Please complete and return in the enclosed stamped, self-addressed envelope*

Please enter the names of the colleges you applied to in the spaces below. Next, indicate your preference of each by circling the appropriate choice. Finally, indicate if you were accepted at each college and where you plan to enroll.

Name College Below:	Your Preference at the Time of Application				Were You Accepted?	Do You Plan to Enroll?
New Paltz (13 14)	1st Choice	2nd Choice	3rd Choice	4th Choice	1 - Yes 2 - No	1 - Yes 2 - No
(18 19)	1st Choice	2nd Choice	3rd Choice	4th Choice	1 - Yes 2 - No	1 - Yes 2 - No
(23 24)	1st Choice	2nd Choice	3rd Choice	4th Choice	1 - Yes 2 - No	1 - Yes 2 - No
(28 29)	1st Choice	2nd Choice	3rd Choice	4th Choice	1 - Yes 2 - No	1 - Yes 2 - No

Below is a list of statements we have heard used to describe various colleges today. For each please indicate whether you agree or disagree that the statement describes The College at New Paltz and your highest other college choice. Circle your answers.

This Describes New Paltz:	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know	Statements		This Describes Other College: Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
47	1	2	3	4	5	Students at college can't get a job after they graduate	62	1	2	3	4	5
48	1	2	3	4	5	Students have a strong desire to perform at their best	63	1	2	3	4	5
49	1	2	3	4	5	Dormitories are too noisy	64	1	2	3	4	5
50	1	2	3	4	5	Drug use is simply not tolerated	65	1	2	3	4	5
51	1	2	3	4	5	Professors challenge students	66	1	2	3	4	5
52	1	2	3	4	5	It is a party school	67	1	2	3	4	5
53	1	2	3	4	5	The college encourages applications from minority students	68	1	2	3	4	5
54	1	2	3	4	5	Students are actively involved in social issues	69	1	2	3	4	5
55	1	2	3	4	5	Learning what is in the textbook is usually enough to pass	70	1	2	3	4	5
56	1	2	3	4	5	Students use alcohol responsibly	71	1	2	3	4	5
57	1	2	3	4	5	Graduates of the school receive respect	72	1	2	3	4	5
58	1	2	3	4	5	Few good students transfer out	73	1	2	3	4	5
59	1	2	3	4	5	Faculty care about students	74	1	2	3	4	5
60	1	2	3	4	5	It has a college atmosphere	75	1	2	3	4	5
61	1	2	3	4	5	The college keeps pace with the times	76	1	2	3	4	5

What major would you like to have in college: _____ (77 78 79)
Please write in desired major

In the space provided below, please add any additional comments about factors which have influenced your choice when deciding about New Paltz. Your time and effort have been greatly appreciated.

_____

_____

_____

_____

Market Penetration

In the absence of comparable national, regional, or sectoral norms, we are required to generate comparable data. This is accomplished by requesting those surveyed, to simultaneously rate the subject institution and their highest other college choices. The results of this technique are encouraging. While students most often do not, or cannot, make comprehensive comparisons between institutions, they generally are able to make judgements about their primary college choice. That is, we can at least expect respondents to rate the college they plan to attend. Thus, data can be generated for competitive institutions by those sampled who will be attending elsewhere; and generated for the subject college by those sampled who will be attending the subject college.

We may now establish a market penetration index for each indicator for both the subject institution and for those institutions with which it competes. Operationally, the difference between the two indicators can be defined as the penetrative advantage index, where positive; or disadvantage, where negative. Exhibit III provides one approach to presenting such data for executive level consideration. Experience, thus far, has demonstrated that the penetrative advantage or disadvantage most successfully describes the position of the institution within the competitive market place. That is, the data now provides descriptive and evaluative information.

The Competitive Advantage

As indicated earlier, the technique requires respondents to indicate levels of agreement or disagreement with various statements regarding the subject college and the highest other college choice. Of those expressing an opinion, the percentage providing a positive reaction to the reputational indicator respresents the favorability score. Operationally, then, we can define the competitive advantage as: the difference between the favorability scores of each indicator for the subject college and the competitive colleges. One method of presenting the competitive advantage is presented in exhibit III. By observation, reputational indicators with relative competitive advantages are easily distinguishable from those with disadvantages. Again, with respect to experience, the difference between each score is of prime importance when establishing the posture of the competitive advantage within the competitive market place.

IV. Reputation and its Association with Student Behaviors

Having established the penetrative and competitive advantages and disadvantages we now turn to associating the presence and quality of the reputation with selected student behaviors. Examples of such behaviors include:

(1) Enrolling by accepted applicants
(2) Persisting by Undergraduate students
(3) Contributing by Alumni

We will employ the first selected behavior as an example in executing one technique for associating reputation with behavior.

As previously indicated, we may divide the responses of sampled participants into dichotmous variables: (1) those who had favorable opinions, and (2) those who had unfavorable opinions; those with no opinions are considered and treated as missing information. Further, since the survey data also is accompanied with enrollment decision information, we may associate each response with the dichotomous behavior of enrolling or not enrolling.

Thus, by crosstabulating each variable by the student behavior, the researcher may determine whether major differences exist for each reputational indicator between the groups who choose to enroll and the group who choose not to enroll. The chi square test of statistical significance may be used to test for significant associations between attitudes and behavior.

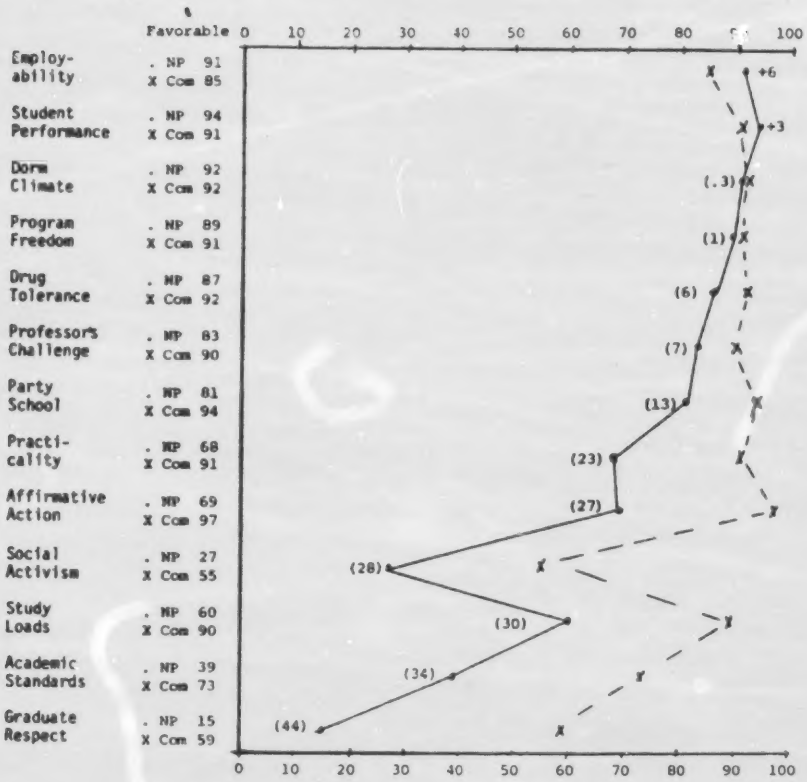
Exhibit III presents one method of demonstrating the relative association which favorable and unfavorable responses have upon the yield behavior of accepted applicants, and the significance thereof. This same technique can be applied to the earlier suggested behaviors, persistance and contributions, by associating such behavior with the reputational indicators.

Other statistical treatments of the data are executed, including the use of multiple regression to establish the relative impact which each of the variables have upon the student behavior. It has been our experience thus far, however, that the simpler treatments of the data are more effective for briefing executive level audiences.

Having established these reputational profiles and their association with student behavior, it becomes the researchers objective to communicate such findings so that appropriate institutional initiatives result. Experience has suggested that providing a quartered matrix which crosstabulates penetrative advantage by competitive advantage is most effective for executing briefings (see exhibit IV).

Exhibit III: One Method of Presenting Competitive Advantage and Disadvantage Indices

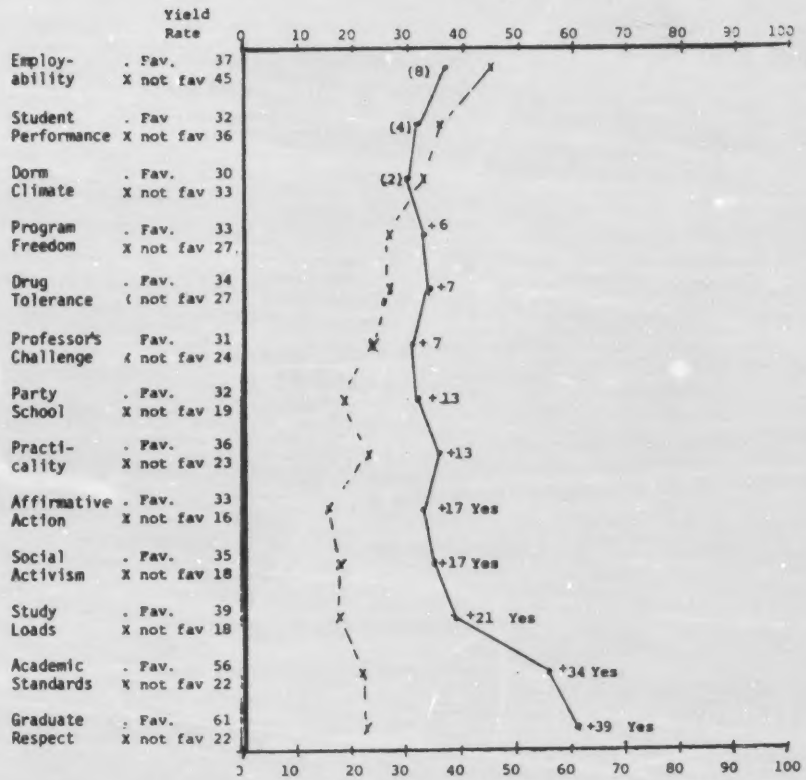
Freshman Favorability Scores on Reputational Indicators
for New Paltz Relative to Institutional Competition



*For illustration purposes only, variable names are scrambled to maintain the confidentiality of the findings.

Exhibit IV: One Method of Presenting the Relative Association which Favorable and ~~Unfavorable~~ Responses have upon Yield

Freshman Yield Rates Associated with Favorable
and Unfavorable Scores on Reputational Indicators



*For illustration purposes only, variable names are scrambled to maintain the confidentiality of the findings.

IMPROVING FACULTY USE OF STUDENT OUTCOMES INFORMATION

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INTRODUCTION

Demands for accountability, improved productivity, increased educational quality, and better information for students reinforce the need for colleges to better document and understand student outcomes. Furthermore, the need for better information about student outcomes to enhance student development and improve institutional planning and management has been documented in Astin's research about institutional impacts on student development (1976 and 1977); in Bowen's (1977) valuable work assessing the returns of individual and societal investments in the postsecondary-education process; and in the developmental research by Clark, Hartnett, and Baird (1977) concerning the use of multiple criteria for assessing the quality of educational programs.

To obtain the student outcomes information required to respond to many internal and external demands, institutions usually conduct some type of student survey in which student goals, plans, activities, and attitudes are documented and the impact of programs are assessed. However, all too often the information obtained through such efforts is given only superficial attention by persons most central in the educational process - the faculty. Why is this the case?

One reason is that student outcomes studies and their application often are focused almost entirely on administrative issues and uses. Consequently

such studies are oriented to institution-wide concerns as opposed to departmental concerns and thus are of limited interest and use to faculty in their planning and decision-making activities. A second reason is that faculty generally have little, if any, involvement in planning for and commitment to the outcomes studies and thus do not take ownership of the study results. A third reason centers on the fact that outcomes study results frequently are not analyzed and presented in ways faculty can use them. Finally, survey directors sometimes do not fully grasp their role as change agents in helping faculty obtain and use student outcomes information.

The need to correct this situation is based on the assumption that student outcomes information is critical to improving the performance and decisions of faculty in program planning and in the teaching/learning process. As Hartnett (1974) points out, in many ways, the need for such information is analogous to the need of the painter, the musician or the performing artist for feedback - or what learning psychologists call "knowledge of results" (Micek and Arney, 1973).

Although many college-wide student outcomes questionnaires have been designed to generate information of use to faculty, getting faculty to make effective use of the information obtained has remained a problem. As a consequence, the overarching question addressed in this study was how to improve faculty commitment to and use of student questionnaire data collected on an institution-wide basis.

BACKGROUND INFORMATION FOR THE STUDY

In thinking about how to answer the major study question, consideration was given to what is known from the theoretical research literature concerning information use and what has been learned from practical experiences.

From this literature base, three major underlying factors appear to influence information use by managers: (1) the organization location of the information provider, (2) the methodological procedures used to gather and analyze the data, and (3) the decision-making context (Weeks, 1980). Furthermore, literature concerning student and/or worker participation in the decision-making process suggests that when participation is viewed as a legitimate activity, productivity and satisfaction increases (Micek, 1974; Davis, 1972; and Blumberg, 1969). Finally, insights about how to improve faculty information use are gained from the "advance organizer" concept described in Ausubel's (1967) theory of school learning. Advance organizers provide an individual involved in learning with sorting and classifying models. Such models draw upon and mobilize concepts in one's cognitive structure which are relevant for and play an assimilating role relative to new learning material. In the context of this study, the individual is the faculty member, the new learning material is the available student outcomes information, and the advance organizer is the process of involving faculty members in developing and implementing a schema for identifying and sorting needed student outcomes information.

From personal experience, it has been observed that when individuals are actively involved in the creation of survey instruments and procedures, they tend to become more committed and are more willing to make effective use of the results. However, all too often when institutions initiate a college-wide student survey, especially when standardized questionnaires are used, the opportunities for faculty to gain some "ownership" of the instruments and processes are practically nonexistant. Therefore, their commitment to and willingness to use the information provided is greatly hampered. As mentioned, how to correct this situation was the focus of this study.

The importance of this study also is based on the paucity of empirical literature regarding the use of evaluative research information, i.e., information gathered for decision-oriented inquiries as opposed to conclusion-oriented inquiries. Three important studies have focused on the use of program evaluation findings, specifically, Weeks, 1978; Patton and Associates, 1977; and Alkin and Associates, 1974. Also a larger number of studies have examined the use of applied social research (Weiss, 1977; Caplan, 1976, 1977a, and 1977b; and Van deVall, Bolas, and Kank, 1976).

While limited attention has been given to empirical research on the use of evaluative information in program decision-making, an abundance of nonempirical literature exists in this area. This literature consists mainly of prescriptive uses or speculations by academics and practitioners about why evaluation results are seldom used (Weeks, 1978). In short, the lack of empirical literature on evaluation utilization supports the need to examine ways for improving faculty commitment to and use of student outcomes information obtained from survey questionnaires.

STUDY METHODOLOGY

Study Design

To accomplish the study's research objectives, an experimental group-control group, post test only design was employed. The design was implemented by selecting two groups of faculty, a participants (experimental) group and a nonparticipants (control) group, within two different collegiate institutions, a four-year college and a two-year college. Those faculty in the participants group participated by (1) identifying the student information needed for their decision-making responsibilities, (2) helping develop a pool of questionnaire items for obtaining the needed student information, and (3) organizing the items into a "mini-questionnaire" format

that could be attached to the appropriate standardized questionnaire.* Faculty in the nonparticipants group did not participate in these three activities.

Following the administration of the selected standardized questionnaires, which were accompanied by the "mini-questionnaire," the results of the surveys were analyzed and summary reports were written. The respective summary reports then were distributed to the faculty in both the participants and nonparticipants groups for their review and use. Subsequently, interviews were conducted with each faculty member in the two groups at each institution to determine their commitment to and use of the student outcomes information.

Selection of the Participants and Nonparticipants Groups

The chief academic officer at both colleges served as the study liaison. Each was instrumental in assisting the study director select two comparable groups of faculty at their institutions.

While a participants group and a nonparticipants group were selected at each institution, the process of selection within each institution varied somewhat because of differences in organizational structure, communication channels, and forces impacting each institution at the time of the study. As a result, the selection of the two faculty groups at the four-year college was accomplished by randomly assigning each of the seven academic departments to one of two groups. Consequently, the participants group at the four-year college was composed of faculty from three departments and the nonparticipants group was composed of faculty from the other four departments.

At the two-year college, the chief academic officer was interested in having faculty participate from each of the campus' four divisions.

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*Standardized questionnaires used in the study were selected from the set of student outcomes questionnaires jointly developed by the College Board and the National Center for Higher Education Management Systems (Gray, et al, 1979).

Consequently, faculty who represented a cross section of the divisions were randomly selected for the participants group. While the researcher expressed some concern about participating faculty in a division talking about the "treatment" with nonparticipating faculty in the same division, the chief academic officer emphasized that such contamination would be very minimal because of the size of each division as well as the independent nature of individual faculty.

Instrumentation and Data Collection

The interview schedule developed to help answer the study's major research question consisted of three sets of questions. The first set of questions asked the interviewees to indicate how useful the survey results would be (1) to them personally in carrying out their decision-making responsibilities, (2) to their department, and (3) to the college, as a whole. Those responding "very useful" or "somewhat useful" also were asked to explain how the results would be useful.

Following this set of questions, each interviewee was asked to indicate how useful the results of student questionnaire surveys were in general. Again, they were asked to explain their answer if they gave one of the two responses described above.

The final set of questions in the interview schedule was directed to only those faculty in the participants group. These questions focused on (1) the value of having an opportunity to participate in the development of the local items, (2) ways their participation could have been improved, and (3) how the overall surveys could have been improved. Generally, the interviews lasted one-half hour.

A total of 56 faculty were interviewed in the study. At the four-year college, a total of 32 faculty were interviewed, 13 faculty were from

the participants group and 19 were from the nonparticipants group. At the two-year college, 24 faculty interviews were conducted, nine from the participants group and 15 from the nonparticipants group.

Analysis of the Faculty Interview Data

As noted, the study design established a participants (experimental) group and a nonparticipants (control) group at each college. The data generated by the interview schedule were in two forms: (1) nominal data - data from the response categories regarding perceived usefulness of the survey information, and (2) anecdotal data - qualitative data produced by responses to the open-ended questions in the interview. Consequently, two types of analysis were required. First, the chi square statistical test was employed to examine whether participants differed from nonparticipants in perceived usefulness of the student information for them, for their department, and for the total college. Second, a content analysis technique was used for examining the responses of faculty to the open-ended questions. This analysis consisted of reviewing each response and then developing content categories that would help in understanding the nature of their qualitative responses.

RESULTS AND DISCUSSION

Will faculty, who participate (a) in determining their own student-outcomes information needs and (b) in developing locally-specific questionnaire items be significantly more interested in and make significantly more use of such information than faculty who only receive survey results? The intent of this section is to provide some answer to this question. In addition, faculty perceptions about the general usefulness of questionnaire surveys are described. Finally, a summary of practical suggestions from the "participants" group about the value of participating in the survey

development process and ways to improve faculty participation in that process is presented.

Each interviewee was asked at the beginning of each interview whether he/she had received a copy of the summary report. In all instances, the answer was "yes." Subsequently, interviewees were asked if they had read the report. Those who answered in the affirmative were then asked a series of questions:

1. How useful do you think the results of the survey(s) will be to you in carrying out your responsibilities at (name of the college)?

2. How useful do you think the results of the survey(s) will be to your department?

3. How useful do you think the results of the survey(s) will be to the college, as a whole?

The responses to each of these three questions were placed in one of four categories: very useful, somewhat useful, not useful, and can't say.

The results of the chi square (X^2) analyses that were conducted to make comparisons between the participants and nonparticipants groups are summarized in Table 1. Examination of these results indicate that when

Table 1

Summary of X^2 Analyses Used to Compare Participants and Nonparticipants Perceptions of Usefulness of Student Survey Results

	Two-Year College	Four-Year College	Colleges Combined
Useful to YOU	X^2 = 3.289 df = 3	X^2= 4.279 df = 3	X^2= 8.295* df = 3
Useful to YOUR DEPARTMENT	X^2 = 1.576 df = 3	X^2 = 10.855* df = 3	X^2 = 12.094* df = 3
Useful to THE COLLEGE as a whole	X^2 = 5.65 df = 3	X^2 = 2.165 df = 3	X^2 = 7.101 df = 3

* Sifnificant at .05 level of confidence.

the responses of the groups at both colleges were combined, a significantly higher proportion of the faculty in the participants groups perceived the survey results to be useful for their own use and for their department than did faculty in the nonparticipants group. This also was true regarding the comparison between the participants and nonparticipants groups in the four-year college with respect to usefulness of the survey results to their departments. It also is interesting to note that none of the X^2 analyses regarding the usefulness of survey results at the college-wide level were significant.

With respect to the ways faculty see the survey results being useful, it can be concluded from the content analysis of expectency remarks that they view the information to be most useful for (1) course/program planning and development; (2) gaining a better understanding of students' needs, status, decision, satisfactions, plans, and activities; (3) recruiting and marketing; (4) verifying hearsay; and, (5) improving relations both within and outside the department and/or college. Furthermore, the responses suggest that faculty, in general, tend to have a better notion about the usefulness of student-survey information at the department and college-wide levels than the usefulness of such information for their own responsibilities.

From the responses to the question concerning faculty opinion about the usefulness of student-questionnaire survey results in general, it appears that faculty are generally positive about the utility of such information. Many faculty pointed out, however, that the usefulness of the information is greatly dependent upon the adequacy of the study design and the way the study procedures are implemented.

The faculty participation processes, which were developed at each of the colleges involved in the study, were tailored to meet the unique organizational structure and the special study questions of interest at each of the

colleges. However, the comments of the faculty in the participants groups indicate that the opportunity to participate in the survey development process is a valued experience. Based on their statements about why the opportunity to participate is valuable, it can be said that, in general, the participation process provides faculty with a chance to get involved in an institution-wide activity and to develop an "ownership" of the survey processes and results. In addition, it allows them to think about how they will use the results before they are reported back to them. As far as ways to improve faculty participation, it is important that an effort be made to keep faculty informed about the status of the project throughout. In short, the more frequent the contact with faculty, the more likely they will own the survey process and make use of the survey results.

Finally, it can be said that faculty in both the participants and nonparticipants groups viewed the overall study as beneficial to their college. However, if faculty are to improve their commitment to and use of survey results, it is important to identify ways to improve the response rate to the questionnaire and to provide the survey results in a more program specific form.

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BOUNDARY SPANNING: A CONCEPTUAL FRAMEWORK FOR EXAMINING THE ORGANIZATIONAL ROLE OF OFFICES OF INSTITUTIONAL RESEARCH

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Introduction

A substantial body of literature has developed over the past 20 years in the area of organization theory, as it is applied to interorganizational relationships and organization/environment transactions. Much has been learned from this literature with respect to "adaptive" organizations, i.e., those which survive during periods of scarce resources, changing markets, and varying economic circumstances. This paper is intended to review the literature and apply it within the context of postsecondary educational institutions. The paper will also state a series of research assertions about which organizational characteristics are most likely to contribute to the adaptiveness and survivability of colleges and universities. Minimally, it is hoped that the paper will provide food for thought and discussion among its readers. At best, it provides a conceptual framework for empirical study that will enable its author to renew exploration of an area of professional and intellectual interest that dates back to his graduate school days.

Organizational Environments

Of necessity, most organizations, including colleges and universities, interact with a variety of other organizations and groups, both formal and informal. These interactions are necessary for the acquisitions of resources (i.e., the money, raw materials, and personnel essential to the activity of

the organization) and for the distribution and consumption of the organization's product. (Thompson and McEwen, 1958; Levene and White, 1961; Seashore and Yuchtman, 1967) Those organizations external to a given "focal" organization with which that focal organization must interact in order to carry out its own mission are termed the organizational environment. (Katz and Kahn, 1966)

The interaction between an organization and its environment is analogous to the biological principle of natural selection. (Aldrich and Pfeffer, 1976) Just as living organisms must adapt to their environment, that is, obtain adequate food supplies, shelter, reproduce in sufficient numbers or face extinction, organizations too must adapt to their environment if they are to remain viable institutions. Organizational adaptation, however, may be studied in terms of the transactions with the environment which permit the acquisition of resources necessary for the organization to operate, and for securing customers to accept the organizational output. As in nature, the greatest threat to adaptability and survivability stems from changes in the nature of the environment.

The concept of a rapidly changing organizational environment was first clearly articulated by Emery and Trist (1966) and has been reinforced by the work of Terreberry (1968) and Liefer and Huber (1977). Terreberry (1968) suggested that nearly all complex organizations operate within a rapidly changing, or "turbulent field" environment. These environments are characterized by uncertainty both with respect to continued supplies of essential resources and with respect to the activities of other organizations within the environment. That colleges and universities operate within a turbulent field environment is evidenced by such characteristics as competition among institutions for shrinking student markets, diminshed levels of federal, state, and private research grants, increased competition with industry for the best and brightest minds, etc.

The organization, typified by colleges and universities, is then a problem-facing, problem-solving phenomenon. Classical organization theory would argue for a "rational model" approach to problem-solving emmanating from the organizational environment, i.e., evaluation of all possible alternative solutions and selection of the most cost-effective course of action. Recent literature suggests, however, that the very complexity of the environment which generates the problems faced by an organization is such that it would overtax the limits of human rationality were the attempt made to fully understand it. Thus the overwhelming nature of environmental complexity forces organizations to operate within the context of "bounded rationality." (Simon, 1957) Thompson (1967) summarizes the problem this way:

> "The focus is on organizational processes related to choice of courses of action which do not fully disclose the alternatives available nor the consequences of those alternatives. In this view, the organization has limited capacity to gather and process information or to predict consequences of alternatives. To deal with situations of such great complexity, the organizations must develop processes for searching and learning, as well as deciding. The complexity, if fully faced, would overwhelm the organization, hence it must set limits on its definitions of situations; it must make decisions in bounded rationality." (p.9)

Boundary Spanning Roles

The interactions between a given organization and other organizations in its environment involve a series of transactions across the boundaries of the respective organizations. (Katz and Kahn, 1966; Thompson, 1967; Starbuck, 1976) These transactions are generally concerned with the intake of resources for organizational activities and the dissemination of organizational output. A characteristic of adaptive organizations may be the ability to accurately identify critical components in their environment (i.e., suppliers of scarce resources and markets for the organization's

product) and the establishment of formal organizational structures to deal with them. (Thompson, 1967; Aldrich and Herker, 1977; Aldrich, 1979). These structures are referred to as "boundary spanning roles." (Thompson, 1967)

Faced with environmental uncertainty, the organization operating under norms of rationality, establishes boundary spanning roles as the vehicles for searching and learning in the environment. Having identified the most crucial components of the organizational environment, boundary spanning roles monitor those segments of the environment. The activities within the boundary spanning roles should enable the organization to learn more about these environmental components and to more effectively deal with them. (Thompson, 1967; Alrich and Herker, 1977)

It is this underlying rationale that is prompting more and more colleges and universities to look to offices of institutional research as focal boundary spanning structures. The scope of their activities, in offices with a boundary spanning thrust, goes beyond simple headcount and credit hour tallying. Institutional research activities also include admissions market analyses, student retention research, outcomes studies, community impact analyses, etc. The objective of these activities is clearly the acquisition of adequate student markets and fiscal resources necessary to operate the college, while assuring that its graduates are marketable and that a demand will persist for the institution's educational product. Boundary spanning is not restricted to institutional research; offices of sponsored research, public relations offices, academe/industry consortia, etc. are all directed to the same objective: institutional survival.

This paper, then, focuses on the relationship between boundary spanning roles and a college's survivability, i.e., capability to adapt to changing

organizational environment. The paper focuses on the office of institutional research as a major boundary spanning role, and proffers a series of assertions about the structure and configuration of that role and its relationship to institutional adaptability. It should be underscored, however, that while discussion focuses on offices of institutional research, the assertions in this paper are generic to all boundary spanning roles within a college or university and should be so interpreted.

Assertion #1: Those colleges and universities which establish boundary spanning roles to deal with crucial components of their environments will be significantly more adaptive than institutions which do not do so.

Such an assertion seems self-evident. If, for example, the identification of student markets for institutional curricula, description of potential student perceptions about the college, measurement of satisfaction levels among current students, identification of major factors in student attrition, and assessment of curriculum-relevant employment and job performance among alumni, are all factors that impact upon an institution's ability to stay in business, then the institution should clearly establish organizational structures, i.e., boundary spanning roles to search and learn from the environment, and to provide the essential measurements described above. A corollary to Assertion #1 might be that adaptive colleges and universities have fully staffed, comprehensive offices of institutional research.

Structuring the Boundary Spanning Role

The relationship between the presence or absence of boundary spanning roles and organizational adaptability to a constantly changing environment may be controlled by structural characteristics of the boundary spanning role. In other words, it may not be enough for a college or university to simply

have an office of institutional research. It is more likely that the manner in which the office is structured will have a profound impact upon the institution's ability to probe, monitor, understand, and manage its organizational environment.

The number of boundary spanning roles conferred upon a given actor is often a function of organization size. (Alrich and Herker, 1977) For example, it is not uncommon in small colleges for the registrar's office to be the repository for most institutional research functions. Similarly, many institutional research offices are expected to assume development and grantsmanship activities. However, Kahn et al (1964) warn against the danger of role overload, that is, assignment of a variety of roles to a single boundary spanner or boundary spanning office, with the expectation that all tasks associated with each role be completed within an unrealistic time frame. To expect a college registrar to fulfill the primary tasks associated with registration, and at the same time to conduct community impact analyses, attrition-retention analyses, outcomes studies, etc., is unrealistic. It is likely that all activities would suffer because of the overloading effect of competing time demands from the registrar and institutional research roles.

Assertion #2: Those colleges and universities which assign separately, and to different personnel or offices, those boundary spanning activities concerned with acquisition of essential resources and markets for the educational product, will be significantly more adaptive than institutions which do not do so.

Similarly, role conflict (Kahn et al, 1964; Schein, 1970), in which individuals are forced to make a choice between two roles, is a problem for the boundary spanner. Logic would seem to dictate that an individual or office charged with activities related to the acquisition of scarce resources or maximizing the output market would not be involved in other non-related

tasks. Returning to our previous example, the institutional researcher engaged in identifying student markets for the college's programs, and at the same time measuring the marketability of those programs among employers, is facing a major task. To require that individual to double as college registrar, indeed, creates the problem of role conflict in which the individual is frequently forced to choose between two sets of competing, vital institutional functions. The result is the diminishment of each function.

Assertion #3: Those colleges and universities in which personnel or offices engaged in boundary spanning activities dealing with the acquisition of essential resources or product markets are assigned few, if any other roles, will have significantly greater adaptability than institutions in which personnel in similar boundary spanning roles are assigned a multiplicity of roles.

Role professionalization refers to the suitability of an actor for a given boundary spanning role as evidenced by the level of knowledge and skills brought to that role. Aldrich and Herker (1977) indicate that an organization's ability to adapt to environmental contingencies depends in part upon the expertise of boundary role incumbents in selecting, transmitting, and interpreting the information originating in the environment as well as successfully representing the organization as legitimate and desirable to that environment. Aldrich and Herker's (1977) assessment clearly reflect the general responsibilities and functions of offices of institutional research.

The expertise evidenced by a role incumbent, i.e., practitioner of institutional research, may be related to the professionalization of that role. If so, then one might expect that the more professionalized the boundary spanning role, the more effectively the activities associated with it will be executed. Before making such an assertion, it is necessary to first define the diminsions of professionalism.

Hall (1975) has examined the so-called "professional model" and has drawn upon earlier studies to identify two dimensions of the professional. The structural dimension, earlier delineated by Greenwood (1957) involves five attributes:

1. Formal training in an area of knowledge that is not readily available to the laity.
2. Professional authority whereby the professional can "dictate" the appropriate course of action for an organization.
3. Formal and informal sanctioning of the profession through licensure, acknowledgement of the right to privileged communication, etc.
4. Subscription to a regulative code of ethics which dictates appropriate behavior for an individual acting in a professional capacity.
5. Professional culture wherein the individual maintains membership in relevant associations, reads publications within the field, is involved in various forms of continuing education, etc.

Hall (1975) also draws upon the work of Gross (1957) to describe the attitudinal dimension of professionalization. Attributes such as a high level of involvement within the profession, belief that the profession is essential to the betterment of the human condition, concern for the advancement of the profession rather than financial self-agrandizement are typical of the attitudinal dimension. While interesting, they do not readily lend themselves to empirical measurement, nor is there a readily apparent relationship to organizational adaptability.

Three characteristics of the structural dimension of professionalization do appear to relate to the effective performance of the boundary spanner in measuring and interpreting the organizational environment. They are training, professional authority, and professional culture.

Training in the activities of a boundary spanning role should contribute to the expertise of the role incumbent and should add to the effectiveness with which the role activities are performed. (Greenwood, 1957; Beal and Wickersham, 1967; Hall, 1975) The broad spectrum of institutional research, as described throughout this paper, should be more capably performed by an individual with extensive training in social sciences, research methods, and tests and measurements, than by an individual, e.g., a college registrar, who is simply assigned institutional research functions.

Assertion #4: Colleges and universities in which the occupants of boundary spanning roles have extensive training for the activities associated with the role will be significantly more adaptive than institutions with role incumbents not similarly trained.

Another measure of expertise in a boundary spanning role incumbent may be the authority acknowledged to that individual by the organization to provide direction for total institutional policy. The acknowledgement of professional authority is based upon the belief that the professional possesses the knowledge base to provide correct information for organizational decisions. (Greenwood, 1957; Etzioni, 1964; Hall, 1975, 1977) Concrete measures of professional authority are evident in the responses to the following questions, again using the office of institutional research as an illustration:

1. To whom does the office report? The President?
2. Does the Director sit on the President's cabinet or Executive Council?
3. What is the role of the office of institutional research in the institutional planning process? Is it a leadership role or simply a supportive role?

Assertion #5: Colleges and universities in which occupants of boundary spanning roles are accorded broad professional authority will be significantly more adaptive than institutions where role incumbents are without professional authority.

Operation within a professional culture would also appear to be an important component of role professionalization. (Greenwood, 1957; Hall, 1975) The practitioner of institutional research who regularly attends in-service seminars/workshops, reads relevant literature within the field, and interacts with other professionals through membership in role-related associations might be expected to be better versed in contemporary developments within the field and, therefore, might be expected to be more successful in the performance of the activities associated with his/her role.

Assertion #6: Colleges and universities in which the occupants of boundary spanning roles operate within a "professional culture" will be significantly more adaptive than institutions where role incumbents do not do so.

Bringing together the structural dimensions of role professionalization, it is now possible to offer an encompassing assertion.

Assertion #7: Colleges and universities which professionalize boundary spanning roles will have significantly greater adaptability than those institutions which do not do so.

The preceeding paragraphs have argued for the necessity of colleges and universities to establish boundary spanning roles to monitor the organizational environment and to make necessary institutional adjustments to changes in that environment. Moreover, the paper has argued that certain structural characteristics can be imposed upon the boundary spanning roles to make them more effective in contributing to organizational adaptability. As persuasive as the arguments might seem, they will derive value only from empirical testing.

Directions for Future Research

The author has conducted research in the area of boundary spanning role structure and organizational adaptiveness. (Middaugh, 1980) This early research suggests three essential components in moving to empirical study of

boundary spanning roles in colleges and universities.

A. Role definition: Not only must the specific offices or roles be identified which are to be viewed as boundary spanning, but appropriate descriptive measures of role incumbents must also be measured. Scope of the boundary role itself must be assessed, as well as other organizational duties held by the boundary role incumbent. Measures of role professionalization must also be established. Subsequent development of a manageable empirical measuring instrument to incorporate the various areas of role definition, coupled with choice of data collection methodology, pose a formidable task for the researcher.

B. Measures of adaptiveness: The purpose of the research is to measure relationships between boundary spanning roles and the ability of colleges and universities to adapt to changing environments. But what are commonly acceptable measures of adaptiveness? Avoiding declining enrollments? Maintaining or enhancing existing levels of non-tuition-based funding? Arriving at definitions and measures of characteristics which accurately reflect a college or university's capacity to adapt to its environment is perhaps the most difficult part of the construction of a study.

C. Moderating variables: Are the relationships measured actually the relationships that are operative? Where do institutional politics, institutional funding sources, general economic conditions, etc. fit into the equation? In order for the study to be truly descriptive, moderating and/or contaminating variables must be controlled.

While the obstacles to the empirical measurement of the assertions outlined in this paper are substantial, the author's own work in this area suggests they are not insurmountable. The benefits accrued by institutions armed with quantitative measures of the environmental relationships described

herein are self-evident: organizational survival. The author intends to pursue the research and urges others to either collaborate or conduct parallel research. The body of literature in organization theory and post-secondary educational administration will be enriched, and our institutions will be better equipped to move into the uncertain years of the late twentieth century.

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SEXUAL INEQUITY IN CAREER CHOICE: HOW CAN COLLEGES HELP?*

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Introduction

The past few decades have been a time of increased awareness of the sexual inequities in employment, e.g., affirmative action legislation, and the ERA movement. Those involved in the feminist movement have gone further and have generally challenged the sex-role stereotypes, which have restricted free choice of careers for both women and men. Consensual ideas of appropriate roles for women have not only governed whether a woman chooses to be a homemaker or to have a career, but also have contributed to the *type* of career or job chosen. Careers or occupations that have been traditional for women are narrow in range, tend to involve subservient, helping or nurturant roles, are less lucrative, and are lower in status and leadership roles. While the number and proportion of women in the labor force has been growing rapidly, women's employment has remained restricted to only a few occupational fields. In 1972, it was reported that 70% of all career women were working in one of four fields: nursing, social work, teaching, or secretarial work (Tangri, 1972). Researchers agree that sex-role stereotypes are powerful determinants in the restriction of women's free choice of career type (Witkin, et al, 1977; Bem and Bem, 1977; Goldman and Warren, 1973). That such stereotypes exist, with regard to type of career, and are held in strong agreement by both men and women, has been shown by several researchers, both on the basis of male and female perceptions and numbers of women employed or majoring in various fields (Chewning and Walker, 1980; Panek, et al, 1977; Harren, et al, 1979; Brenner and Tomkiewicz, 1979). One aspect of this study was to update and replicate both of these measures of sex-role stereotyping of career fields.

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*This study was done as part of a requirement to complete an M.A. Degree in Clinical Psychology. Anyone who would like a more detailed explanation of the methodology or results is invited to request a copy of the write-up of that study.

How can colleges help women to enter a greater variety of career fields? Knowledge of the characteristics of women who have been able to defy sex-role stereotypical career-aspirations may aid us in counseling other women into appropriate fields for their abilities and interests. Certain demographic and personality characteristics have been found to discriminate the woman who chooses a non-traditional career field or major in college (the Role-innovator or NT) from the woman with a more traditional orientation (Traditionalists or T). Some researchers believe Role-innovative women to be social misfits (the "social deviance" hypothesis); while others believe that these women have experienced more enriched backgrounds (the "enrichment hypothesis"), in terms of a variety of role models. The present study contrasted these two hypotheses and examined a variety of personality variables shown by past researchers to correlate with career choice (Stake, 1970; Psathos, 1968; Astin & Myint, 1971; Reynolds & Jones, 1978; Almquist & Angrist, 1970; Tangri, 1972; Stewart & Winter, 1974; Orcutt, 1979; Jordan-Viola & Fassberg, 1976). Also included are some new variables inferred by the author from feminist research to contribute to Role-innovation (Hjelle & Butterfield, 1974; Vankatesh, 1980; Dempewolff, 1973; O'Keefe, 1972, and Fowler, et al, 1973). The variables studied can be seen in Table 1, which contains a summary of the hypotheses of this study and the results. The unique value of this study was that a *number* of variables were studied simultaneously, so that a profile could be drawn of the Role-innovator *vis-à-vis* the Traditionalist. Also unusual was the chance to compare both groups of females to *males* on the same measures. Self-perceptions were used for the personality variables, representing a more accessible and economical form of measurement, and also an important and personal perspective of the subjects.

Method

Two surveys were administered to two separate groups of males and females at State University of New York at Plattsburgh. The Freshman Survey was administered to all freshmen attending Summer Orientation, and provided the demographic variables, such as parents' education and occupations, as well as self-perceptions on several personality traits. Freshman Surveys from several years (1978-80) were used as a combined sample in order to increase the number of subjects in the study. Finding a sufficient

number of non-traditional women majors in a largely traditional female university was a problem. Except for the recently emerging fields of computer science and business, our largest programs continue to be education, nursing, and home economics.

The Program Perception Questionnaire was administered to students living in the dorms, both males and females, of all class levels. Their perception of the curricula offered at Plattsburgh were rated on an eleven-point scale, from masculine (1) to feminine (11). In addition, they rated themselves on several personality variables in a semantic-differential style. Three hundred and forty-nine students responded to the Program Perception Questionnaire, an ample number for perceptual ratings of programs; however, the number of non-traditional women was small, making interpretation of the results of the personal traits from this questionnaire speculative. Please bear this in mind when examining these results. This study will be duplicated with larger and more diversified populations in the future.

Programs were designated as "Traditional" or "Non-traditional," using both criteria, i.e., students' perceptions *and* the proportion of women enrolled in a program. Cut-offs of mean ratings >6.5 or <4.5 and percent females enrolled of $>65\%$ or $<45\%$ were chosen for traditional and non-traditional programs, respectively.

Table 2 shows the programs as classified by both techniques into traditional or non-traditional categories. There is a good deal of agreement between the two criteria; however, some notable exceptions indicate that stereotypes do lag behind changing trends. For example, accounting was rated on the masculine side, yet more females than males were enrolled in the field (58%). Music is seen as a feminine field, but is male-dominated at Plattsburgh (18% females). The perceptual criteria is generally more extreme and limited, providing greater contrast between the two groups of subjects.

Results were contrasted, using these two criteria. Step-wise discriminant analyses were performed to assess the ability of the personality variables and demographic characteristics to discriminate between the Traditional or Role-innovative and Non-traditional women (see Fig. 1 and 2). Analyses of variance were also performed in which all three groups of subjects were compared, i.e., Traditional females, Non-traditional females, and Males (see Tables 3 and 4).

Results and Discussion

Program Perceptions

Results of the Program Perception Questionnaire confirmed that sex-role stereotypes, measured by perceptions, do still exist and are held in strong agreement by men and women students at Plattsburgh. Only six of the 43 programs rated showed significant differences in mean ratings by men and women ($p < .05$, two-tailed t-test). For the most part, perceptions correctly mirrored actual enrollment proportions, with two exceptions: 1) the emerging fields and 2) only the Traditional females accurately assessed the extreme femininity of highly female-dominated programs such as home economics, nursing, and special education. In general Non-traditional women behaved like men. They rated more programs on the masculine side than did Traditional women.

Freshman Survey Variables and Demographics

The interpretation of these results was simplified by the development of a profile of the NT female as compared to the T female, using a stepwise discriminant analysis. In this way the relative importance of the variables could also be assessed and redundant information removed. Fig. 1 presents these results. Significant discriminant functions were found for both criteria. The profile differed somewhat for the two criteria. In both cases the most important discriminant was math ability, followed on the positive side, i.e., NT females exceeded T females, by independence, intellectual self-confidence, then high school average. Other than less interest in marriage by NT females, the negative loadings varied by criteria. Using the perception criteria, NT females appear to have less social interest or abilities. Thus the evidence lends support to each of the two hypotheses under study; the "enrichment" and "social deviance" hypotheses. An alternative hypothesis, which explains the lesser social knowledge of NT women in the perception criterion, is that the solitary nature of the subject matter they study: math and science, is related to these traits. Rather than being socially "deviant," they may be more suited to such fields of study. Future studies will compare males and females in these fields to students in other fields to test this hypothesis.

A better overall interpretation of the data than either of the above mentioned hypotheses and one that avoids labels and political arguments

is seen when the two groups of females are compared to males. The Non-traditional females seem androgenous. They are similar academically to males, but socially to Traditional females. Table 3 presents the results of one-way analyses of variance comparing the three groups. Non-traditional females resembled (or even exceeded) males in their superior math abilities, yet, like their Traditional sisters, they had achieved higher high school averages than males. In spite of the superior academic abilities of NT women, their intellectual self-confidence lies somewhere between T females and males. Socially, NT females resemble T females. They share the curious contradictions of their Traditional sisters in that they report themselves as having developed more friendships, yet see themselves as less popular and less socially self-confident than do males. Only for the perception criteria, which is limited to fields most typically and extremely male-dominated such as math and science, do the NT females resemble males socially. Women in these fields report less social knowledge than T females. Finally NT females were the *least* interested of the three groups in preparing for marriage while at college. These women seem to have postponed or set aside thoughts of marriage while preparing for their career.

Personal Traits from Program Perception Questionnaire

As mentioned before, these results must be interpreted with caution, due to the small number of NT women in the sample. Table 4 presents the results of one-way analyses of variances performed on the three groups simultaneously. The table is organized by similarity of means of NT females to either T females or males. Again the suggestion of androgyny is there. NT females resemble T females in their femininity, conventionality, gregariousness, yet have begun to move closer to males in these traits. They also resemble or seem to exceed (not necessarily significant differences) T females and sometimes males in independence, autonomy, dominance, and activity. They resemble males in their competitiveness, but are more achievement-oriented like their T counterparts.

Fig. 2 presents profiles of the NT vs. T females, using stepwise discriminant analyses. Significant functions were found for both criteria and agreed with the hypotheses of the author, inferred from feminist and other research. NT women were more independent, dominant, autonomous, but less feminine and conventional. Results for other variables, such as assertiveness, were mixed and contradictory. Further study is needed,

with larger samples, to replicate these results.

Summary

To summarize, the profile of the Non-traditional woman emerges as follows: She is academically superior, especially with regard to math skills; more independent, dominant, autonomous, competitive, and confident of her intellectual abilities, but less gregarious, conventional, and feminine than her Traditional counterpart. She is better equipped to compete with men in the Non-traditional fields that are highly mathematical and intellectual and require more solitary work, yet may do so at a social and personal cost. She seems to value marriage less or be more willing to postpone it than either Traditional females or males, possibly because she sees it in conflict with her career aspirations.

Our role at colleges could be to counsel and support Role-innovative women and to encourage those with similar abilities and personality profiles to enroll in Non-traditional fields. Support groups or clubs for Non-traditional women may be helpful. At some colleges, women's studies forums perform this service. Also, other women with similar skills could be encouraged and supported to develop the amount of independence and autonomy needed at this time to consider entering male-dominated fields.

At the admissions level, women with high math scores on aptitude and achievement tests or measures should be encouraged to major in Non-traditional fields. High school counselors should be alerted to this possibility. Some research in the field has suggested that women are advised into Traditional fields because of the stereotypes held by high school and college guidance or career counselors. Providing updated information and training to such counselors may be a way of breaking this cycle.

Colleges can help to change perceptions or stereotyping of these fields by students, as well as counselors. Fields that have recently emerged as less male-dominated in terms of enrollment, such as accounting, were incorrectly perceived as being "masculine." Clearly stereotypes lag behind reality and continue to influence the career choice of both men and women.

Participation by colleges in nationwide development of day care centers could help to relieve some of the conflict felt by women between marriage and careers. Presently women are pressed by circumstances either

to make a choice between these two important life goals or to postpone one or the other.

Finally, the comparisons made between men and women revealed some interesting inconsistencies in college women at Plattsburgh that suggest a need for remediation. Women in this study, whether NT or T, had less self-confidence than men, both socially and intellectually, even though they reported better social skills and had achieved higher grades in high school, and/or had superior math abilities. Support groups and programs designed to enhance self-confidence in college women could contribute to more effective job-seeking skills, and enable them to compete with men in the move up the corporate ladder to management positions. Updated information and role models provided by Role-innovative women, particularly those who have successfully integrated their careers with marriage, could help dispel the myths and stereotypes that discourage women from aspiring to non-traditional fields and contribute to sexual inequity in employment.

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Table 1. Summary Comparison of Results with Hypotheses

Variable	Hypothesis	Result
1. Mother's Occupation	NT have NT mothers	No difference
2. Relative Educational Level of parents--Mother:Father	NT > T	No difference except perception profile
*3. SAT Math & Math Ability	NT > T	NT > T
4. High School Average and Academic Ability	No difference	No difference; except perception criteria
*5. Educational Aspirations	NT > T	NT < T
*6. Independence	NT > T	NT > T
*7. Autonomy	NT > T	NT > T
*8. Activity	NT > T	NT > T
9. Self-knowledge	NT > T	No difference
*10. Self-confidence (Intellectual)	NT > T	NT > T
*11. Dominance	NT > T	NT > T
12. Assertiveness	NT > T	Suggestive-contradictory
13. Competiveness	NT > T	Suggestive-contradictory
14. Drive to Succeed	NT > T	No difference
15. Popularity	NT < T	No difference
16. Friendships		No difference
17. Gregariousness		NT < T
*18. Social Knowledge	No difference	NT < T (Perception Only)
19. Social Self-confidence	No difference	Contradictory-depends on criteria
*20. Femininity	NT < T	NT < T
21. Conventionality	NT < T	NT < T
22. Sensitivity to Criticism	NT < T	No difference
*23. Goal of Preparing for Marriage While at College	NT < T	NT < T

* Significant $p < .05$ using t-test or analysis of variance. Other variables, listed as > or <, contributed to a significant discriminant function.

Table 2. Comparison of Two Criteria for Role Innovation

	Stereotype Criterion (Mean Rating)	Enrollment Criterion (% Females)
TRADITIONAL PROGRAMS		
Both Criteria Agree		
Child Family Service	9.0	100
Hearing & Speech Science	7.9	100
Home Economics Education	9.5	100
Special Education	8.1	99
Nursing	9.4	97
Food & Nutrition	8.5	94
K-12 Speech & Hearing Handicapped	8.1	94
Elementary Education	8.6	91
Early Secondary Education	7.9	
French	7.5	88
Theater	6.9	77
English	7.6	76
Spanish	7.1	66
Perceptions Only		
Secondary Education	7.1	47
Music	6.8	18
Enrollment Only		
Psychology	6.48	82
Behavioral Science	5.9	80
Medical Technology	6.0	79
Sociology	6.3	75
Art	6.4	71
Health Education	6.1	65
NON-TRADITIONAL PROGRAMS		
Both Criteria Agree		
Engineering	3.2	9
Physics	3.8	11
Geology	4.49	13
Chemistry	4.49	32
Political Science	4.45	38
Environmental Science	4.5	42
Perceptions Only		
Accounting	4.4	58
Biochemistry/Biophysics	4.2	46
Economics	4.4	48
Enrollment Only		
Geography	4.9	0
Music	6.8	18
Communication Arts	6.0	30
Mathematics	4.9	30
Mass Media	5.7	37
Computer Science	4.6	40
Biology	4.8	44
Business	4.6	45

Table 3. Comparison of Mean Responses to Freshman Survey Variables--Traditional, Non-traditional Females, and Males*

	ENROLLMENT RATIO CRITERION			
	Traditional Females	Non-Traditional Females	Males	SIGNIFICANT COMPARISONS**
NON-TRADITIONAL FEMALES RESEMBLE MALES				
SAT Math	492	515	524	M & NT > T
MATH Ability	3.00	3.36	3.33	M & NT > T
Independence	3.63	3.85	3.72	NT > T
Preparing for Marriage	3.16	2.73	2.98	NT < T
NON-TRADITIONAL FEMALES RESEMBLE TRADITIONAL FEMALES				
High School Average	86.3	86.3	83.4	T > M
Self-confidence (Intellectual)	3.26	3.38	3.54	NT & T < M
Self-confidence (Social)	3.22	3.23	3.40	NT & T < M
Popularity	3.26	3.27	3.36	None
Friendships	4.04	4.01	3.82	
Social Knowledge	3.73	3.67	3.56	T > M
N	489	210	546	

	PERCEPTION CRITERION			
	Traditional Females	Non-Traditional Females	Males	SIGNIFICANT COMPARISONS**
NON-TRADITIONAL FEMALES SIMILAR TO MALES				
SAT Math	502	537	524	M & NT > T
Independence	3.60	3.78	3.72	None
Preparing for Marriage	3.23	2.99	2.98	T > M
Social Knowledge	3.71	3.44	3.56	NT & M < T
NON-TRADITIONAL FEMALES SIMILAR TO TRADITIONAL FEMALES				
High School Average	86.91	87.7	83.4	T & NT > M
Self-confidence (Intellectual)	3.22	3.41	3.54	T < M
Self-conficence (Social)	3.21	3.21	3.40	T < M
Popularity	3.23	3.19	3.36	T < M
Friendships	3.99	3.99	3.82	T > M
NON-TRADITIONAL EXCEED BOTH GROUPS				
Academic Ability	3.55	3.76	3.52	NT > T & M
Math Ability	3.05	3.83	3.33	NT & M > T NT > M
N	342	83	546	

* Only significant differences ($p < .05$ one-way analysis of variance) are shown.

** $p < .05$ Scheffe's Test.

Table 4. Comparison of Responses to Perception Questionnaire Traits--Traditional, Non-traditional Females, and Males

	ENROLLMENT CRITERION			
	Traditional Females	Non-Traditional Females	Males	SIGNIFICANT COMPARISON**
*Femininity	5.92	5.45	1.85	All
*Conventionality	4.55	4.28	3.65	T & NT > M
*Gregariousness	4.69	4.63	4.06	T > M
Independence	5.20	5.53	5.09	
Autonomy	4.89	5.23	4.84	
Dominance	4.37	4.70	4.66	
*Competitiveness	3.89	4.28	4.45	M > T
Assertiveness	4.88	4.78	4.85	
Activity	5.01	5.28	5.01	
Achievement-orientation	5.71	5.55	5.30	
N	126	40	114	

	PERCEPTION CRITERION			
*Femininity	6.09	5.92	1.85	NT & T > M
*Conventionality	4.64	4.21	3.65	T > M
*Gregariousness	4.67	4.50	4.06	T > M
Independence	5.17	6.00	5.09	
Autonomy	4.80	5.50	4.84	
*Dominance	4.19	5.14	4.66	NT & M > T
*Competitiveness	3.78	3.86	4.45	M > T
Assertiveness	4.75	5.14	4.85	
Activity	4.92	5.64	5.01	
Achievement-orientation	5.77	5.86	5.30	
N	96	14	114	

Coefficients*

Enrollment Criterion

Step	Variable	Coefficient
1	MATH ABILITY	.55
2	MARRIAGE	-.44
3	INDEPENDENCE	.51
4	SELF-KNOWLEDGE	-.36
5	HIGH SCHOOL AVERAGE	.35
6	SAT MATH	.22
7	SELF-CONFIDENCE (INTELLECTUAL)	.27
8	DEGREE	-.18
9	SELF-CONFIDENCE (SOCIAL)	.17

Canonical Correlation = .304 p .0000

N Traditional 489
Non-traditional 210
Total 699

Stereotype Criterion

1	MATH ABILITY	.81
2	SOCIAL KNOWLEDGE	-.52
3	RELATIVE EDUCATION	-.29
4	INDEPENDENCE	.26
5	FRIENDSHIPS	.24
6	MARRIAGE	-.16
7	SELF-CONFIDENCE (INTELLECTUAL)	.30
8	SELF-CONFIDENCE (SOCIAL)	-.27
9	HIGH SCHOOL AVERAGE	.15

Canonical Correlation = .408 p .0000

N Traditional 342
Non-traditional 83
Total 425

*Standardized canonical discriminant function coefficients.

Fig. 1. Profile of the Role Innovative Woman - Freshman Survey Variables.

Coefficients *

Enrollment Criterion

Step	Variable	Coefficient
1	FEMININITY	-.619
2	INDEPENDENCE	.494
3	ASSERTIVENESS	-.669
4	AUTONOMY	.342
5	DOMINANCE	.422
6	ACHIEVEMENT	-.365
7	COMPETITIVE	.268
8	CONVENTIONAL	-.238

Canonical Correlation = .340 p .0116

N T 126
NT 40
Total 166

Stereotype Criterion

1	DOMINANCE	.489
2	INDEPENDENCE	.409
3	GREGARIOUSNESS	-.476
4	ACTIVITY	.567
5	CONVENTIONAL	-.377
6	FEMININITY	-.364
7	ASSERTIVENESS	.421
8	AUTONOMY	.300

Canonical Correlation = .589 p .0291

N T 96
NT 14
Total 110

*Standardized canonical discriminant function coefficients

Fig. 2. Profile of Role-innovative Women - Perception Traits.

What Happens 'Twixt the Cup and the Lip: Data to Information to Action-- Data Development in a Complex Multi-Level Environment

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My presentation will be a bit different from the others, in that rather than describing a particular study, or instance of the use of data, I am going to relate to you the case study of the development of an Office of Institutional Studies in the Central Office of a multi-campus university system.

The University of Massachusetts has three campuses, a comprehensive University Center in Amherst, a Medical Center in Worcester, and an urban campus, with developing graduate programs in Boston. This multi-campus system is governed by a single Board of Trustees which is appointed by the Governor, and a president who serves at the pleasure of the Board. Each campus is headed by a Chancellor, who reports directly to the President. In addition, the President retains a small central office staff of approximately twenty professionals. This central staff includes University Counsel, collective bargaining personnel, central budget and planning staff, and a Public Relations Director. Many University-wide functions such as the Administrative Data Processing, the University Controller, the Treasurer, and the Internal Auditor report to the President through his central staff.

All public institutions in Massachusetts are further governed by a statewide Board of Regents, also appointed by the Governor. The Board of Regents is responsible for overall governance, and planning and policy direction for all of public higher education in the state. As you have probably guessed by now, the central problem for developing a system level office of Planning and Institutional Studies lies in the interstices between the campuses, the institutional Board of Trustees and the Board of Regents and the Regents staff.

In any organization, it is important to match the level of the data to the level of decision making. In a situation such as the Central Office, which is the middle level in a tri-level hierarchy, this match is crucial. For our purposes, we divided data and the level of decision making each into three categories as follows:

Levels of Data	Levels of Decision Making
Policy	Policy
Summary Level	Implementation/Process
Operational	Operation

Each of the levels of decision making exist in virtually all organizations. On a campus for example, the operational level consists of those decisions which are necessary to say, get a student registered, or to run an admissions or financial aid office. The implementation/process level, which requires summary level data, would be those decisions which are made at the vice-presidential level, or by committees of operating personnel--how long should the registration period be? How much weight should SAT scores be given in the admissions process? The implementation/process level would also include initiation functions for issues on which final disposition lies at the policy level. For example, new academic program development usually begins at this level, with Board approval usually necessary.

Although we can reach some consensus on the nature of operational and summary level data, it is more difficult to address what constitutes policy level data. A working definition of policy level data includes the following:

- it is aggregated (to what level?);
- it is placed within an external context;
- it includes trend data analysis and;
- categories of data relate directly to the policy issues at hand.

In developing policy level data, we focused on a determination of the type and level of data appropriate to a system level office. Primarily, we defined it by what it is not. We determined that the campuses should retain responsibility for developing detailed enrollment, admissions and other student related data, faculty/workload statistics, space utilization analysis and all other detailed campus-focused information. Institutional Studies in the Central Office would focus more broadly on university-wide issues which are relevant to the President and the Board of Trustees; the development of reports for external distribution and, the development of external contextual data and information for policy, planning and decision making. These specific tasks all led to the establishment of a summary level data base for planning and decision making.

Three specific products which we have developed over the past year illustrate this focus; The Monthly Indicator Report, Environmental Scanning and the development of data in support of Collective Bargaining. The Monthly Indicator Report consists of both a financial section and a non-financial section. The financial section is a fairly conventional overview of the state of each campus, and the University as a whole along a variety of financial measures. These include expenditures to date in personnel and non-personnel subsidiary accounts, and monitoring of expenditures in grants and contracts. Each of these are then compared to the previous month and to the same date last year. The second, or

non-financial section consists of an Indicator of the Month. Each month a different indicator is selected for analysis. These indicators have included a look at admissions, degrees granted, and enrollment trends. Future plans include such issues as faculty salaries and trends in faculty movement.

Environmental Scanning consists of three data related areas; access to demographic data, establishment of a comparative data base for peer institutions, and economic indicators. We currently have demographic data available from the census with on-line computer access. We have begun to develop a computer based comparative data base with comparative data at the national, regional and institutional level on a variety of topics ranging from faculty salaries to student data. The area of economic indicators, is our weakest area, although the recent addition of staff with economic expertise promises to address this problem in the foreseeable future. The development of data in support of the Collective Bargaining includes the usual employee trend studies and projections. In addition, we have begun exploring the development of a computer based cost modeling system for use during negotiations.

CONCLUSION

Has this effort been successful? Since concerted effort in this direction has only been in effect for about one year, any definitive judgement would be premature. The Monthly Indicator Report has been very well received by a limited distribution group of primarily Central Office staff. We will be able to better evaluate its acceptance when we expand distribution to the campuses and members of the Board of Trustees. Both the Environmental Scanning and data in support of

Collective Bargaining projects are in embryonic states.

The most measurable effects to date of this new direction has resulted from the overall improvement in our data base, as opposed to a specific product. These effects have been as follows:

- enhanced perception of the Office of Planning and Institutional Studies as a data source among the central staff members;

- improved credibility with the Board of Trustees and;

- increased utilization as a data source by the campuses and Board of Regents staff.

EXAMPLE

June 15, 1982

MEMORANDUM FOR: President David C. Knapp
and President's Office Staff

FROM: Jan Napora, Ellen O'Connor, Linda Post

SUBJECT: Monthly Indicators Report

Attached is the first in a regular series of Monthly Indicator Reports. The purpose of these reports is to both inform staff in the President's office and on the campuses, and to build a uniform university-wide summary level data base.

Part I of this report is a fiscal analysis summary, by campus for the last month. Contextual information is provided through comparisons with the previous month and last year; expenditures year to date and projected yearly expenditures are also included. Information on the President's Office, the Hospital and Group Practice is also provided. This portion of the report was prepared by Linda Post, and comments can be directed to her.

Part II of this report consists of indicators of the month. Each month we will select a different set of indicators for display and analysis. By the end of the first year cycle, we will have developed trend data on a variety of important issues. This month the selected indicators focus on financial aid.

We have developed a tentative schedule of the monthly indicators for the next year, including salaries, faculty movement and various cost analyses. However, we have reserved some space to add indicators suggested by other staff members. Ellen O'Connor did the data collection and analysis for this section of the report. Comments can be directed to either me or her.

This, the first of the Monthly Indicator Reports, is being distributed only to staff in the President's Office. As the concept develops, we expect to enlarge circulation to the Chancellors, key persons on the campuses, and others. We very much look forward to your comments and suggestions.

EXAMPLE

MONTHLY REPORT
FOR MAY 1982

The attached tables summarize personnel, payroll, and expenditure data for the month of May for each campus and for the University as a whole. Highlights of this month's report are as follows:

AMHERST - Although expenditures are up significantly from last month, almost all of the increase is due to the occurence of five pay periods this month rather than the usual four. When adjusted for the number of pay periods, there is essentially no change in payroll expenditures from last month and a % increase in total state expenditures. This % increase is mostly due to a increase in the 08 account for water and sewer, over last month.

When compared to budget, total state expenditures are slightly below budget while both state payroll expenditures and number of state positions filled are right on budget. Alternatively, nonstate payroll expenditures are running % over budget for FY82.

With regard to Grants and Contracts, both the number of proposals submitted and the number of awards received are up % and %, respectively, from last month; however, the dollar value of awards received are down % from last month. Assuming Amherst receives approximately the same amount of award money in June as in May, then the dollar value of grant and contract awards this fiscal year will be % under budget and 13% below that of FY81.

BOSTON - Both number of state positions filled and, subsequently, state 01, 02 payroll expenditures are down slightly from last month, after adjusting for five pay periods. On the other hand, both other state and non-state payroll expenditures and total state expenditures are up % this month after adjusting for five pay periods.

Projected state positions filled and state 01, 02 payroll expenditures are right on budget for this fiscal year. Likewise, total state expenditures are projected to come in slightly under budget. Other payroll expenditures are running way over budget because of large unanticipated increases in the "state 03" and "state special" payrolls resulting from the reorganization and closing of Boston State College.

MEDICAL SCHOOL - Total state expenditures for the month of May are % below April's expenditures when adjusted for five pay periods. However, April's expenditures were abnormally high even after adjusting for the one-time expenditure of $ in the Family Medicine Residency Program. Hence, when compared with March's expenditures, total state expenditures this month show a slight increase after adjusting for the extra payroll, and are currently running % below budget.

State 01, 02 payroll expenditures are up slightly over April's adjusted figure while other payroll expenditures are down slightly over the same period. Similarly, state payroll expenditures are projected to be % under budget for FY82 while other payroll expenditures are projected to be % over budget for the fiscal year.

Once again, the number of state positions filled has not changed substantially since last month and is still running % to % under budget.

TOTAL UNIVERSITY - Total state expenditures are up % over last month's revised figures after adjusting for five pay periods. Also, when adjusted for the number of pay periods, there is essentially no change in payroll expenditures from last month.

When comparing projected expenditures to this fiscal year's budget, state 01, 02 payroll expenditures are right on budget; other payroll expenditures are running % over budget; and total state expenditures are % below budget. Number of state positions filled are also right on budget.

Net cash balance available for investment - cash balance on all funds minus state funds and projects - is approximately $ million this month. This is an % increase over April and a % increase over May 1981.

PRESIDENT'S OFFICE - Total expenditures are up % over last month and % over May last year. Likewise, payroll expenditures are up % over last month and % over May 1981. Although this signifies a dramatic increase in spending, both total expenditures and payroll expenditures are well under budget at % and % of budget, respectively.

HOSPITAL - Materials not submitted.

GROUP PRACTICE - Total expenditures for May are down % from April's level but are up % over May 1981. Similarly, gross patient revenues are up over April, which was an unusually low month, and % over May of last year. Projected expenditures for the fiscal year are slighlty over budget, but that represents no problem since projected revenues are % over budget.

The group practice's cash balance is at $ million, the highest month-end level ever.

MONTHLY REPORT
FOR MAY 1982

	Current*** Month	Last Month	% Change from Last Month	% Change from Same Month Last Year	FY82 Budget	Expenditures Year To Date	Projected Expenditures For FY82*	% of Budget
AMHERST								
Total State Expenditures								
Payroll Expenditures:								
State 01, 02								
All Other								
Total								
Positions Filled:								
State 01, 02								
All Other								
Total								
Grants & Contracts:								
Proposals Submitted								
Awards Received								
Dollar Value								
BOSTON								
Total State Expenditures								
Payroll Expenditures:								
State 01, 02								
All Other								
Total								
Positions Filled:								
State 01, 02								
All Other								
Total								

NA = Not Available
* Expenditures Year to Date + (Current Month's Expenditures x 4/5).
**Current Month's Receipts + Receipts Year to Date.
***Current month includes five pay periods rather than the usual four.

INDICATORS OF THE MONTH

The monthly indicators for June focus on financial aid. The extent to which recent changes in federal funding policy and rising costs in higher education affect student enrollment is of increasing concern to institutional administrators. Three groups of variables have been selected to provide insight into this issue; the relationship between income, average award and tuition changes, need versus aid and an analysis of the interaction between the aggregate student expense budget and various aid sources.

INCOME, AVERAGE AWARD AND TUITION CHANGES INDICATOR: When average income for both independent and dependent aid recipients is compared to average award and tuition rates over time, several interesting trends begin to emerge. These variables help explain the University's ability to offer award packages that keep pace with changes in income and tuition. Ideally, tuition and inflation increases should be matched by injections of revenues into financial aid as a university faces an obligation to provide full aid when needy students are accepted.

Table I lists these figures for both Amherst and Boston; whereas Chart I and II are graphical depictions of each campus' percentage change in the variables. The percentage change from FY 1978 to FY 1979 in average award for Amherst was a 20% increase, but the increase from FY 1979 to FY 1980 was only 3%. This low was off-set in part by the percentage change from FY 1980 to FY 1981 where the size of the average award rose by 13%. Independent student's income has risen at a roughly constant rate with the exception of an 18% dip between FY 1978 and 1979. This constant increase was relatively close to the rate of inflation which is significant because tuition has risen at a greater rate.

TABLE I

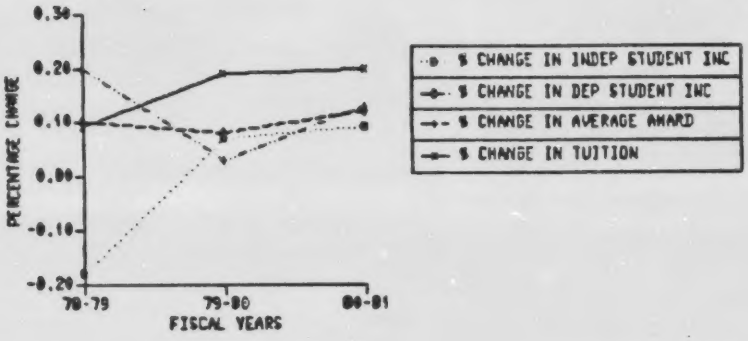
TUITION, AVERAGE AWARD AND AVERAGE INCOME

	1978	1979	1980	1981	1982
Tuition	450	525	625	700	952
Average Award					
Amherst	1,552	1,877	1,940	2,192	N/A
Boston	1,560	1,536	1,608	1,785	N/A
Dependent Student Income					
Amherst	16,800	18,480	20,003	22,408	N/A
Boston	13,069	13,415	14,902	16,417	N/A
Independent Student Income					
Amherst	2,635	2,150	2,305	2,547	N/A
Boston	2,782	2,903	3,841	3,526	N/A

Tuition increases jumped from a 9% hike during 1978-1979 to a steady 20 percent rise in subsequent years. This gap of about 10% between tuition and the other variables suggest that, since 1979, parents of students on aid and aid recipients have contributed a larger share of their income to educational costs.

CHART I

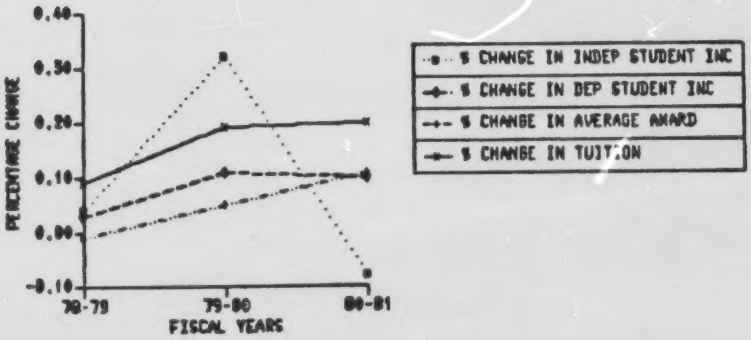
INCOME, AVERAGE AWARD, AND
TUITION CHANGES FOR THE
AMHERST CAMPUS



Boston's graph (Chart II) shows that the percentage change in independent students income swung from 4 percent rise over FY 1978 to FY 1979 to a soaring 32% increase during the following year, and then dropped to an eight percent decrease over 1980 to 1981. It is difficult to say why these aberrations occurred. Perhaps more truly needy students chose to attend during 1980-81. Average award and dependent student income increases nicely converge during the 1980-81 period, but the gap, similar to Amherst, between tuition increases and average award payouts has held steady at about 10% since 1978.

CHART II

INCOME, AVERAGE AWARD, AND
TUITION CHANGES FOR THE
BOSTON CAMPUS



A Case Study of The Academic Planning Process

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This paper reports a case study analysis of the planning process at a major public university over a ten-year period. It is unique because, unlike previous studies which have dealt with the planning process in either a technical or superficial manner, it conceptualizes planning as a political process. The selected institution launched three distinct planning efforts during this time, offering a microcosm for study. Studying the same institution over time provided a setting in which certain variables were stable and, facilitated comparisons which could not have been possible among different institutions. These comparisons added to the understanding of those factors which contributed to the success or failure of the effort.

The focus of this study was on comprehensive institutional academic planning. Comprehensive, in the sense of examining the way an institution integrates its various subunits. Planning as it occurs in the individual subunits is not without its importance, but, for purposes of this study, was dealt with only as it related to overall planning. Institutional, as opposed to state-wide or multicampus approaches, although the interface bebween the institution and the larger entity to which it belonged could not be totally ignored. Academic, in the broad sense of dealing with policy questions and resource allocation, but with physical planning only tangentially, as it impacted upon academic decisions.

Brief Literature Review

During recent years, change has pervaded higher education institutions. A survey of over 1200 institutional presidents, found that over three-fourths of the respondents could identify a major change that had a significant impact on their institution (Hodgkinson, 1974). However, despite the realities of the environment, a subsequent study found that the planning efforts undertaken by institutions fared quite poorly.

Although presidents unanimously endorsed planning as necessary and desirable, academic plans, on the whole, were characterized by a rejection of the idea of scarcity and lack of connections to the decision-making process. (Cohen and March, 1974). Thus, although institutional leaders recognized the problem and albeit in a generalized manner indentified the tools with which to cope with the problem they, for the most part, have been unable to convert this knowledge into an operative academic plan.

In order to plan more successfully, institutions need a better understanding of those factors which contribute to the success or failure of their efforts. The recent literature on planning has been primarily descriptive rather than analytical. NCHEMS commissioned a series of four case studies in 1978, a project which appeared to be promising. However, upon publication this turned out to be merely an examination of the planing process documents rather than the process itself. (NCHEMS, 1978). The limited analytical literature available has tended to focus primarily on program budgeting, business techniques as applied to education, or the cost study approach. There is very little attention paid to a discussion of the interrelationship among value considerations, leadership, and participation. Indeed, most of the writing has totally ignored the political context within which such planning efforts have taken place.

Methodology

Preliminary research indicated that the case under consideration could be divided into three subcases based on three distinct chronological periods. Each period was distinct in approach, principal characters, and outcome. Each subcase was then individually evaluated along two dimensions--a product dimension and a process dimension.

The hypothesis was that performance along either dimension would be accounted for by three variables. These variables, which were identified

through an extensive review of the literature included: a clear conception of institutional mission, the level of faculty participation, and the quality of academic leadership. It was further hypothesized that one or more of these variables accounted for performance along a particular dimension more than along the other dimension.

The case study method was selected in order to provide sufficient detail and analysis to illuminate the complexities of the planning process. The decision to study an institution over time rather than comparing institutions, was based largely on two major considerations. First, since the object of this study was an in-depth analysis, there is some question whether a sufficiently thorough understanding of the political and administrative complexities of a second institution would have been possible. Without access to candid and sometimes sensitive information at other institutions it would have been impossible to duplicate the in-depth and critical analysis. Second, the institution selected offered the near ideal compromise. Since preliminary research indicated that there had been three major planning attempts over a relatively short period of time, it was possible to make comparisons within a relatively stable context.

Data for each case study was developed in three steps. The first was to discuss each subcase informally with persons who had been on campus during that time. This provided preliminary, although unfocused, information. The second step was to review the available written documents, including minutes of meetings, correspondence, reports, and newspaper accounts. Particularly for the first two subcases, there was extensive documentary material in the university archives, the planning committee files—which were still intact—and in individual personal files. This background information was used to produce a chronology of events, an

interview list, and a list of guiding questions for the interviews. The third step involved extensive interviews with participants. Almost thirty formal interviews were held, averaging over ninety minutes each. On a more informal basis, countless conversations were conducted with faculty, staff, and administrators over a several year period. These discussions contributed greatly to the overall understanding of the institution and the context in which planning efforts were taking place.

Definitions

There are almost as many definitions of planning as there are writers addressing the topic. Although there is a great deal of overlap and duplication, two viewpoints on planning emerge. The first, offered largely though not exclusively, by writers of the late 60's and very early 70's and by writers with a business orientation is essentially product oriented. This conception of planning focused on how to arrive at and what to do with a "plan". (Drucker, 1964).

Later writers and those writing with specific application to higher education modified this concept by focusing on the planning process (Banghart and Trull, 1973 and Halstead, 1974). As practice indicated that careful planning did not necessarily result in implementation, particular attention was paid to the development of criteria for evaluating planning effectiveness over time (Glenny and Weathersby, 1971).

This case study is interested in both of these dimensions of planning. The development of a final plan is important as the end product of the process, and as the mechanism against which to measure progress. However, the process itself, including the development and the implementation of the plan, is integral to the entire process.

The following are the operational definitions of these two dimensions

of planning as used in this study.

Dimension I, the product dimension, was primarily concerned with whether a plan was produced and implemented. The criteria which were used in evaluating a planning effort along this dimension included: were the goals clearly determined, the problems diagnosed, the options thoroughly examined, the possible solutions selected, and a plan of action determined? Although the focus along this dimension was primarily with the product, the mere writing of the plan was not sufficient to indicate success. The plan must have been, to some extent, successfully related to the ongoing life of the institution. However, there was no attempt to evaluate the long term outcomes of the changes instituted.

Dimension II focused on the process. A planning process was evaluated along Dimension II by ascertaining its value to the institution. The criteria used included: Did the process serve to educate the university community to the existing possiblilities and constraints? Did it foster an acceptance of the concept of planning in general and of this process in particular?

Institutional Mission - For purposes of this study, institutional mission was defined as the compendium of values and priorities of the institution. The issues which an institution must face in this regard are staggering. Some of them include a delineation of the constituencies served; the balance between teaching, research and service (Kerr, 1963 and 1972) and an outline of institutional role as a professional school, liberal arts college, graduate center, etc. (Baldridge, 1971a and 1971b). Although virtually all institutions have "mission statements", they all too often are authored for public relations purposes, rather than being a thorough look at the institution, its present and future.

A review of the literature on institutional mission and goal develop-

ment raised several questions useful for evaluating the development of institutional mission. These questions form the core of the operational definition of institutional mission as used in this study.

Has the institution reached broad agreement on its mission?

Has the institution resolved the conflict among goals?

Has the institution been able to move from ideal goals to realistic goals capable of implementation?

There is ample evidence in the literature that mission definition is not an easy task for institutions. Several authors describe the splits within and among goals as both fundamental and inevitable (Baldridge, 1971, and Kerr, 1963), springing from the fact of competing pulls on an institution as it attempts to adhere to expectations of its "backers" in government and society, while at the same time trying not to stray too far from internal assumptions and expectations (Richman and Farmer, 1974).

Faculty Participation - The political environment of the university as well as the traditional role of the faculty in shaping academic programs argues for a higher level of faculty involvement than may be necessary in other types of organizations. The literature offers several good reasons for including faculty in the planning process.

First, planning is an opportunity to familiarize faculty with internal administrative problems and priorities as well as with external constraints imposed by local, statewide or federal regulation. This continuous communication forces both faculty and administrators to recognize diverse points of view and conflicting interests. Faculty participation in planning is, therefore, an education process which should be viewed as a long term investment (Lindblom, 1959).

A second reason for faculty participation stems from the fact that

planning suggests change, and that change and innovation by their very nature are threatening. By actively engaging faculty in the planning process, the number of unknown factors can be reduced, and resistance to change can be reduced by relieving real or perceived threats to autonomy and security. Participants will view the project as their own if they have participated in diagnosing the problem and have agreed on the definitions and importance of the problem and adopted the solution by group decision. (Watson, 1969).

The issue of faculty participation presents the planner with two problems. The first, is how to identify faculty with the ability to exert a leadership role during planning and implementation. Lindquist described the ideal faculty participant as a "cosmopolitan local", a person who has an extensive network of external contacts, yet is esteemed and influential in campus governace groups, and is often an opinion leader. He concludes that the extent to which planners can recruit a core of faculty able and willing to exert a leadership role in the implementation process may prove to be a key to successful planning. (Lindquist, 1974).

The second problem is how to structure the process to assure the optimal utilization of the participants. Faculty participation in planning has been studied along three dimensions: the type of committee structure; the degree of faculty/administration integration; and the amount of faculty participation. In most cases, planning was accomplished through the existing committee structures where it had to compete for attention among the array of items generally handled through this structure; that faculty and administrators participated seperately and; that faculty participation was generally light and regarded as peripheral. Recommendations to address these problems have included joint planning committees to

provide a mechanism for communication between faculty and administrators and to focus attention on planning, and; steps to assure that participation in planning be considered a legitimate part of the faculty roles, and be recognized in the criteria for faculty promotions (Palola, Lehmann and Blischke, 1971).

The following questions form the core of an operatonal definition of faculty participation as used in this study.

Is the level of participation appropriately based on historical practice, organizational structure and the desirability of using the planning process as a tool to educate faculty?

Has a cadre of faculty members been cultivated who will be useful to the process?

Is there a structure that assures that faculty input is not merely reactive, and that participation is active and meaningful?

Leadership - A fully developed discussion of leadership in a university must be placed within the context of the relevant organizational/governance models. Unfortunately, this discussion is beyond the scope of this short paper.

In the literature, essentially three perspectives on leadership emerge. Although they do not represent all perspectives on leadership, they are useful in understanding the role of the leader as planner. The first, is the planner as manipulator, using power in a "mechanistic" sense. This approach portrays the planner as retiring to his/her office and developing a plan in a technical sense (Temkin, 1972). This model is inappropriate to the university due to its peculiar organizational structure and diffuse power pattern. The second concept of leadership (Neustadt, 1960) points out that even in a hierarchy, power and authority are not as simple as they seem. This perspective emphasizes the importance

of personal influence.

The third concept of leadership was developed by futuristic writers (Bennis, 1966 and Mosher, 1971), who describe the future organizational model as an adhocracy. Their description of an adhocracy has many of the same attributes as a university; decentralization, increased participation, specialization and professionalism. The essence of leadership in such an organizational structure is stimulative and collaborative rather than directive.

It is difficult to formulate an operational definition of leadership in the university setting. However, it is quite clear that leadership is more than issuing an order and having it carried out. Leaders must command considerable persuasive powers, and be able to function in an environment in which specialists, i.e. faculty, can make legitimate claim to having superior expertise in some areas.

Analysis

The case study institution was a well established graduate/research university. It was one of the several "flagship" campuses within a major state system. It experienced significant programmatic and physical growth throughout the late sixties and the seventies. During the period under study, the institution enrolled approximately 23,000 students, roughly divided into 14,000 undergraduates. 4,000 evening students and 5,000 graduate and professional students. Major programs were available in close to one hundred fields, through the Faculties of Arts and Letters, Natural Science and Mathematics, Social Sciences Education and ten professional schools. There was also a large Division of Continuing Education.

Each of the two major divisions, Health Sciences and Academic Affairs was headed by a Vice President, who reported directly to the

president. In general the academic structure was quite traditional, with department heads or program directors reporting to Deans, who then reported to the appropriate vice president. Over the decade under consideration, there was a great deal of movement at the Dean level and within the position of Vice President for Academic Affairs. During this time, however, the president and the Vice President for Health Sciences remained constant.

1972-1974 - Shortly after the appointment of a new president, a Vice President for Academic Affairs (VPAA) was recruited with a specific mandate to produce an academic plan. Over the next three years, the university was to become involved in what were essentially three separate attempts to develop this plan. The first attempt consisted of a draft personally developed by the VPAA. However, it was soundly rejected by the Deans and Provosts, who in turn, set out to develop their own plan. However, after several drafts, they were unable to reach any agreement. The third effort was initiated by the Faculty Senate as a result of frustration at being left out of the process. This effort, which took over a year, produced an official document. However, it was vague and had no impact on the university community.

The university make no progress in developing a consensus on institutional mission as a result of this planning effort. The VPAA's articulation of institutional mission was divergent from the prevailing norm in the academic world in general and that institution in particular. The Deans and Provosts and the Faculty Senate focused within a very narrow range, and were preoccupied with process. The effort was further characterized by almost no faculty participation until late in the process, and a basic disagreement on what the desireable role of the faculty in academic planning should be. The VPAA's personal style,

concept of administrative responsibility and view of the university worked against his being able to serve as an effective leader.

At the end of this time, the VPAA had severely strained relationships with the Deans, the faculty and the president, resulting in his resignation. The university community was torn by differing opinions on the nature of academic planning, the appropriate roles for the different constituent groups and even on what constituted a proper time frame. The period ended not only without producing a plan, but with significant costs incurred by the breakdown of the planning process.

1975-1976 - After the resignation of the VPAA, the university did not have a permanent VPAA for two years. Nevertheless, the president was determined to develop a plan. In an effort to avoid the mistakes of 1972-1974, the president decided to retain control over this process himself, at least at the beginning.

The mechanism the president selected was to appoint a "blue ribbon" committee of faculty, with faculty members as cochairs. This committee was appointed by the president, and was to be advisory to him. The committee undertook an ambitious and extensive study of the university. They ultimately produced two documents, an interim report, which aroused a great controversy on campus, and a final report.

This planning process also lacked a clear sense of institutional mission. Although the president offered his personal view of the mission in a separate document, and the Committee tried to define specific elements of institutional mission, subsequent events indicated that the stated mission did not represent a consensus. It also was judged as having an insufficient amount of faculty participation. Although the planning committee was mostly faculty, it was a small group, and did not

adopt a widespread consultative or participatory process . Leadership within the committee was exerted by both the president and the co-chairs. However, when deliberations entered the forum of the entire university, the leadership of the co-chairs was insufficient and presidential leadership lapsed.

Although this process produced a plan, there was widespread agreement that no recommendations of the plan were implemented. On the process dimension, this planning effort received mixed evaluations. Interviewees pointed out that the process had educated people to the reality of limited resources, created a cadre of persons knowledgeable about the university, and served as a basis for future plans. However, the costs of another failed effort at planning, in terms of the perceived credibility of future planning efforts were high.

1976-1980 - The most recent planning efforts studied were very closely identified with the new VPAA who arrived on campus in the fall of 1976. Prior to his appointment, this Vice President, like his predessor several years earlier, was assigned the task of developing an academic plan.

Soon after arriving on campus, the VPAA appointed a small number of task forces to advise him in selected areas. While these panels were deliberating, the office of Academic Affairs would be reviewing suggestions of priorities from previous plans. The new VPAA emphasized that this planning cycle was to benefit from the suggestions and evaluations of the previous President's Committee on Academic Planning, refining and challenging them and developing alternatives where necessary.

This effort resulted in an academic plan which had fairly wide consensus on campus. There was general agreement that the VPAA had been an effective leader, willing to consult with various groups and make

the best possible use of the Deans in the planning process. However, there was only limited participation by average faculty. Although the sense of institutional mission was considered vague - relying heavily on statements contained in previous documents - it caused little or no reaction.

This plan was the only one developed during this period which was technically capable of implementation. It was the VPAA's own plan and was written in terms (student/faculty ratios) that he was able to control through his budgetary power. This approach might have worked had he remained in office. However, he left campus for another position before he had time to implement the plan.

Most interviewees felt that this planning process had been beneficial to the university, if only because the institution had completed a major planning effort without having experienced a major trauma. Others pointed out that the consultative process educated persons to internal and external contraints.

The results and/or conclusions are based <u>only</u> on the research conducted at a single institution and have, therefore, limited applicability. However, they provide interesting points for further research at other institutions.

- In the absence of all three variables a clear sense of institutional mission, faculty participation, and appropriate leadership--there is little probability of long term success at either developing and implementing a plan (Dimension I) or using the planning process for purposes of ongoing institutional development (Dimension II).
- Faculty participation and administrative leadership affect the planning effort along Dimension II. Further research is necessary

in order to determine the appropriate level of each variable or the best mechanisms to be employed.

- Since each of the planning efforts under consideration were characterized by the lack of a clear mission statement, this research did not provide any insight into the impact of institutional mission along either dimension. Perhaps research at those institutions which are marked by a clear institutional mission, particularly limited mission, private institutions, may be helpful.

	Sub case I	Sub case II	Sub case III
LEADERSHIP	VPAA's personal style, concept of administrative responsibility and view of the university worked against his being able to serve as an effective leader.	While the forum was the committee itself, leadership had been exerted by both the president and the co-chairs. When deliberations entered the the forum of the entire university, the leadership of the co-chairs was insufficient and presidential leadership lapsed.	Agreement that the VPAA had been an effective leader. He was willing to consult with various goups, and to make the best possible use of the Deans in the planning process.
PARTICIPATION	Low level of faculty participation A basic disagreement on what the desireable role of the faculty in academic planning should be.	The amount and nature of faculty participation was insufficient. - although mostly faculty, the PCAP was a small group - the PCAP did not develop a widespread consultative or participatory process - PCAP members had been selected in the President's office with limited involment by the Faculty Senate	High degree of participation by Deans Limited participation by average faculty
MISSION	VPAA's articulation of institutional mission was divergent from the prevailing norm of the of the academic world in general and the university in particular. The Deans and Provosts were unable to articulate a university mission due to their pre-occupation with process. The Collegium focused within a very narrow range.	The president offered his personal view of the mission of the university in his statement, The University: Its Purpose and Fulfillment PCAP specifically tried to define the elements of the institutional mission. Events surrounding the release of the Interim Report indicated that this mission statement did not represent a consensus.	Sense of institutional mission was vague--relied largely on statements contained in previous documents --little or no effort to rethink the basis for them or to build consensus. There was little or no reaction to the mission statement

	Sub case I	Sub case II	Sub case III
Major Planning Activity	Personal planning by VPAA Academic Affairs Council Faculty Senate Efforts	"Blue Ribbon Committee consisting of faculty, administrators and students--appointed by the president and advisory to him	Developed a consultative plan
Key Participant	VPAA Deans and Provosts Faculty Senate appointed committee	Two co-chairs of the "Blue Ribbon Committee" In later stages the President and the Faculty Senate	the Vice President for Academic Affairs
Major Event or Result	draft document developed-later rejected by the Deans and Provosts draft document-lack of consensus final document produced-too late to have any impact on the process	Two documents, an Interim Report, and a final report neither had much impact	Plan completed in three years Fairly widespread consensus on campus Some evidence of implementation

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ESTIMATING NET COST OF COLLEGE ATTENDANCE IN NEW YORK STATE

Development of Net Cost Indices for Full-Time Undergraduate Students in Four-Year Colleges, for Relative Comparison Over Time

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INTRODUCTION

The formal title of this paper was chosen for its brevity and clear reference to the general subject: net cost of attendance. But the subtitle is the more accurate one. What is reported here, in the hope that it may be of value to those working in the Northeast is the development of three preliminary indices of net cost of attendance for the ultimate purpose of enabling comparisons to be made across types of institutions and over time.

Two statements should be clearly made at the beginning. First, the work reported here is at a preliminary stage of development. Second, as emphasized by colleagues in a recent paper: "...one cannot subract average aid per recipient from average total cost and define the difference as the 'average cost incurred by every student.' However, one can describe the growth of program awards and institutional costs from year to year to examine trends over time." [8]. Ultimately the work reported here would be considered successful if it led to indices comparable in function to the Dow Jones or Standard and Poor's averages of major industrial, utilities, transportation, etc., stocks -- offering a "birds eye view" of complex movements of costs of college attendance over time.

The three indices described in this paper are not the final ones to be developed in New York. Work has already begun on more effective indicators of net cost of attendance. It is instructive, however, to review both the procedures and the implications of the three preliminary indices described below.

BACKGROUND

Higher education in New York is under the authority of the Board of Regents [5]. One of the many responsibilities of the Regents, whose staff is the State Education Department, is planning and coordination.

The Board of Regents, in their 1980 Plan for the Development of Post-secondary Education [6], identified as a policy objective maintenance of "a balanced system of higher education." The unique strengths of all of the sectors should be preserved in the public interest, in order to offer broad curricular choice, to retain the existing rich variety of campus settings, academic styles and institutional missions, and to safeguard the economic support for local communities provided by the presence of colleges and universities.

After some initial discussion, "maintenance of a balanced system" was determined to mean--at least initially--monitoring of sector balance, or sector stability, in terms of enrollment shares. But it would not be enough to look only at annual enrollment statistics; some better insight into shifts of student institutional choice from one sector to another (should such shifts occur) would also be desirable. Student choice is a complex subject but cost is known to be an important factor [7]. Net cost--the "real cost" to the student or his/her family after all financial aid has been received--is one determinant of access to college, particularly which college is attended, and also sector enrollment balance.

Measurement of net cost, as one aspect of monitoring sector balance, was appealing for several reasons. Essential data are for the most part readily available. Net cost is at least partially subject to programs and policies over which a state government has control, especially financial aid and public tuition levels. Some index of net cost, if it were calculated consistently using comparable data, over a period of years, could suggest needed changes. For example, one would expect (without really knowing, of course) that an increasing differential between cost of attending public institutions and similar independent institutions would eventually result in significant shifts in enrollments to the publics from the independents [1]. If this could be shown to be due solely to cost factors, then some legislative or other changes might be warranted.

While there are differences between the ways in which higher education is organized in New York, and in other states of the Northeast, there is plenty of common ground. The preliminary efforts reported here should be of interest to colleagues in other states as well as those in New York.

LIMITATIONS OF THIS WORK

Net cost of attendance is unique for each student at each institution. Within a single institutional type (e.g., independent colleges) may be colleges very diverse as to tuition level, location, prevailing life styles. For even one small institution there may be a wide range of net costs depending on student backgrounds and student aid packaging. Development of indices to summarize these different net costs requires many hundreds of averages - even averages of averages. Just as average net cost figures can be worked out for individual institutions, weighted averages based on enrollment may have to be calculated for institutional types and for sectors. Since so many variations of tuition charges, student aid, living expenses, etc., are averaged out, it would be incorrect to refer to a single "average net cost" at any one point of time. Instead the indices should be used to show trends over time or relative changes among sectors, institutional types or income categories.

Ideally, the concept of net cost should include all costs to the student and/or family related to college attendance and all forms of student aid. In the work reported here only tuition and required fees, and certain other costs: room and board, books, personal expenses, and so on, are considered. Likewise only selected types of student financial aid are included.

Other limitations are: the analysis is restricted to full-time undergraduate students only (except where indicated otherwise) and to four-year institutions only (except where indicated otherwise). Loans are not included as financial aid, mainly because of uncertainty about how to measure the value of subsidized interest, and because loans are essentially purchases of a service, although they may be helpful - even essential - to some prospective students. The income categories used, although carefully developed and documented, are unavoidably arbitrary. There also may be gaps or errors in the data used, although where these have been found, they have been corrected as carefully as possible. Even with these limita-

tions, however, the present work has produced interesting results which it is hoped will stimulate discussion and reactions from the field.

INDICES DEVELOPED SO FAR

Three different indices are described below: "Net Cost Index 1," the "Tuition Net TAP Index," and "Net Cost Index 2." They represent the first three stages in an ongoing exploration of the measurement and interpretation of net cost of attendance. None of the indices is perfect, indeed there probably is no perfect index, but there are insights to be gained from each of them. The major elements of the three indices are shown in Exhibit 1.

"Net Cost Index 1"

This was the initial effort, designed primarily to determine the feasibility of developing a net cost index. Only two sectors, the independent and the State University (SUNY), were considered. Comparable data for 51 independent institutions and 43 SUNY campuses were taken from the Education Departments' Higher Education Data System. Approximations of room and board and other costs were from the CSS College Cost Book for 1980-81. As Table 1 shows, both sectors included some 2-year colleges.

Table 1

"Net Cost Index 1" Summarized

Public (SUNY)		Average
University Centers	(4)	$ 3,133
Health Science Centers	(1)	3,810
University College	(11)	2,755
Specialized	(3)	3,293
Statutory, Cornell	(3)	5,429
Ag. & Techs.	(6)	2,973
Community Colleges	(15)	2,520
	(43)	2,987
Independent		
Multiversity	(4)	$ 6,795
University	(3)	5,019
Coll. Complex	(13)	5,771
College	(12)	4,337
Eng.-Technology	(5)	4,841
Two-year	(10)	3,144
Health Sci Center	(1)	2,958
Specialized	(1)	5,618
Seminary	(1)	2,983
Nursing	(1)	4,761
	(51)	$ 4,731
Net cost ratio	1:1.6	
Net cost index	0.6	
Net cost difference	$1,744	

Exhibit 1

Major Characteristics of Three Net Cost Indices

	"Net Cost Index 1"	"Tuition Net TAP"	"Net Cost Index 2 "
year(s)	1980-81	1978-79 thru 1981-82	1980-81
Income Categories	1	3	3
Basis for Calucation	institution	sector	institution
No. Institutions	51 independent 43 public	_____	72 independent; 32 public
Costs	T&F, other	T&F	T&F, other
Aid	NYS, Fed.; inst.	TAP	TAP, Pell
Inst. levels	4-yr., 2 yr.	4-yr.	4-yr.
Student type	undergrad; FT & PT	undergrad.; FT	undergrad.; FT
Method	T&F revenues-aid/ undergrad. enroll-ment; + other costs	T&F - TAP	T&F + other cost -TAP - Pell
Data sources	Supp. 2, HEDS, CSS	HEDS, BLS	HEDS, CSS, Supp. 2, BLS

These are the steps that were taken in developing Net Cost Index 1:

1) Total tuition and fees revenues from undergraduates were identified for each institution from State Education Department data.
2) From the same source, financial aid totals for Pell grants, New York State grants and scholarships, institutional awards, other Federal (SEOG, CWS, and NDSL) programs were obtained and subtracted from the tuition and fees revenues total for each institution.
3) The difference, T&F revenues less aid payments, was divided by the institutions' "actual number of full-time and part-time students attending (undergraduate)" from the HEGIS enrollment questionnaire.
4) For each institution, estimates of room and board costs, books, transportation and other expenses were taken from the College Cost Book. These were totaled and added to the result of (3) to produce an arbitrary average net cost of attendance.
5) Averages of the institutional average net costs were obtained for each institutional type, and for each of the sectors.

The resulting sector averages, $2,987 for SUNY; $4,731 for the independent sector do not mean very much for 1980-81, since they do not cover all costs or aid. They can, however, be compiled quickly and easily, and if they were to be obtained in the same manner each year for the period 1980-81 through 1989-90, say, they might be useful indicators of changes in the effectiveness of financial aid programs, the cost of higher education in relation to other costs in the same period. They might also help to explain shifts in sector enrollment shares that may have occurred during the period.

The two sector averages might be expressed as "net cost difference" (1,744), as a net cost ratio (1:1.6), or as a relative net cost index 0.6.

The "Tuition Net TAP" Index

In this exploratory effort, the objective was to develop inter-sector net cost indices for four consecutive years for three income categories of students, to consider as costs only tuition and required fees, and to consider only TAP (i.e., aid provided via the New York State Tuition Assistance Program) as financial aid. Further constraints were to include only full-time undergraduates at four-year institutions.

These steps were taken:

1) Tuition and fees data, for 1978-79 through 1981-82 were obtained for each four-year institution enrolling undergraduates from the Department's Higher Education Data System (HEDS) [3]. These data were averaged by institutional type and sector; but were not weighted by enrollment. Averages by sector are shown as Table 2.
2) Three broad income categories were assumed: low, middle, high. Bureau of Labor Statistics (BLS) total budget estimates for families of four, living in major U.S. urgan areas, specifically Buffalo, NY, were selected as the basis for a rough approximation of family income at the three levels [2]. Although these are market basket estimates, and do not include unspent income, further checking convinced us that they were reasonable for 1979 (the latest year for which available).
3) The 1979 total budget figures were adjusted for the next three years by reference to the Consumer Price Index [4]. From these expenditure estimates, used as proxies for income, net taxable balance (NTB), the income statistic used in calculating TAP awards was derived using a recongized formula for this purpose. (In practice the NTB used in calculating actual TAP awards comes from the previous year's State income tax return). The results are shown as Table 3.
4) TAP Schedule "C" was used to estimate average awards for the three income levels, for the four years, for the public sectors (combined) and for the independent sector. Schedule C and the actual calculations are included as appendix 1 to this paper.

Table 2

Average Tuition and Fees Charges by Sector, 1978-81
Weighted by Number of Institutions by Type

	1978-79	1979-80	1980-81	1981-82
SUNY	$ 996	$1,123	$1,171	$1,343
CUNY	892	966	967	963
Total Public	969	1,082	1,117	1,243
Independent	3,307	3,594	4,003	4,529

Table 3

Total Budget Figures, Three Income Levels
Family of 4, Buffalo New York Area

	1979[a]	1980[b]	1981[b]	1982[b]
Low	$ 12,409	$ 14,059	$ 15,690	$ 17,510
Middle	21,806	24,706	17,572	30,770
High	32,013	36,271	40,478	45,174
	Net Taxable Balance, Three Income Levels (derived from total budget figures)			
Low	$ 7,709	$ 8,810	$ 10.190	$ 12,010
Middle	16,606	19,306	22,072	25,270
High	26,813	30,871	34,978	39,674

[a] Handbook of Labor Statistics, Bureau of Labor Statistics, Dec. 1980, Tables 150-152.

[b] Adjusted from Consumer Price Index.

The results are shown in Table 4. In each cell, the average tuition and fees charge less the calculated TAP award, is given for the public and independent sectors, for the year and income groups as indicated, resulting in a "Tuition Net TAP" index. The assumed net taxable balance is also included (in parentheses) for reference. The results are also expressed as public-independent net cost (i.e., tuition net TAP) ratios and differences in Table 5.

It must be reemphasized here that what is reported is primarily a concept and a method, and not specific numerical results. Clearly other costs than tuition and fees are involved, other sources of aid than TAP are available, and three income levels might be considered by some to be insufficient. The approach does have some appeal however because, insofar as it goes, it reflects the real world, and because its very simplicity would enable it to be quickly and easily compiled on a regular basis. An index, after all, can be useful over a period of time if it is compiled consistently year after year, if its limitations are respected, and if it is understood to be meaningful in a relative rather than an absolute sense. Were the results in Table 5 to be studied accordingly, the reader might begin to suspect that:

- Due to inflationary income growth, TAP awards for low income stu- students have decreased consistently over four years. Middle income students (as defined in this exercise) were not eligible for TAP after 1979-80. High income students have never been eligible for TAP (except in cases where adjustments are made in NTB for siblings attending college).
- The difference between public and independent tuition net TAP for low income students, proportionate to NTB, is about two-thirds as large as the comparable figure for middle class students; more than twice that for high income students. Thus, it is relatively more expensive for a low income, than for a middle income student to attend an independent college when only tuition and TAP are considered.
- TAP has served to narrow the public-independent cost difference for low income students and to some extent for middle income students, which has probably promoted choice and sector balance.

Table 4
INTER-SECTOR NET TUITION INDEX
Tuition and Fees, Less TAP Payments Estimated for Selected Years
Public and Independent Sectors

Student Income Category	1978-79	1979-80	1980-81	1981-82
Public T&F - TAP / Ind T&F - TAP	$\frac{969-644}{3,307-1,475}$ =	$\frac{1,082-672}{3,594-1,390}$ =	$\frac{1,117-597}{4,003-1,280}$ =	$\frac{1,243-557}{4,529-1,114}$ =
Low	$\frac{325}{1,832}$ = .18	$\frac{410}{2,204}$ = .19	$\frac{520}{2,725}$ = .19	$\frac{686}{3,415}$ = .20
Assumed NTB	($7,709)	($8,810)	($10,190)	($12,010)
Public T&F - TAP / Ind T&F - TAP	$\frac{969-200}{3,307-602}$ =	$\frac{1,082-200}{3,594-232}$ =	$\frac{1,117-0}{4,003-0}$ =	$\frac{1,243-0}{4,529-0}$ =
Middle	$\frac{769}{2,705}$ = .28	$\frac{882}{3,362}$ = .26	$\frac{1,117}{4,003}$ = .28	$\frac{1,243}{4,529}$ = .28
Assumed NTB	($16,606)	($19,306)	($22,072)	($25,270)
Public T&F / Ind T&F	$\frac{969-0}{3,307-0}$ =	$\frac{1,082-0}{3,594-0}$ =	$\frac{1,117-0}{4,003-0}$ =	$\frac{1,243-0}{4,529-0}$ =
High	$\frac{969}{3,307}$ = .29	$\frac{1,082}{3,594}$ = .30	$\frac{1,117}{4,003}$ = .28	$\frac{1,243}{4,529}$ = .28
Assumed NTB	$ 26,810	($30,871)	($34,978)	($39,674)

Table 5

Results From Table 4: Indices, Ratios, Differences

Income Category & Type of Index	YEAR 1978-79	1979-80	1980-81	1981-82
Low				
Index	.18	.19	.19	.20
Ratio	1:5.6	1:5.4	1:5.2	1:5.0
Difference	$1,507	$1,794	$2,203	$2,729
Mid				
Index	.28	.26	.28	.28
Ratio	1:3.5	1:3.8	1:3.6	1:3.6
Difference	$1,936	$2,480	$2,886	$3,286
High				
Index	.29	.30	.28	.28
Ratio	1:3.4	1:3.3	1:3.6	1:3.6
Difference	$2,338	$2,512	$2,886	$3,286

"Net Cost Index 2"

This index shares characteristics with both of the efforts already described, but it also goes beyond them. As in "Net Cost Index 1" only one year (1980-81) is considered; however, estimates of room and board and other costs are included in addition to tuition and required fees, and Federal, as well as state, student aid is included. As in "Tuition Net TAP," the three major sectors: SUNY, CUNY, and the independent sector are included; as are three income categories.

Again, source of tuition and fees data was HEDS, and source of other costs data was CSS. Again, this exercise was limited to full-time undergraduate students in four-year institutions. Average income levels for low, middle, and high income categories was estimated on the same basis as for "Tuition Net TAP," and NTB was computed in the same manner.

After a number of colleges were eliminated due to being ineligible for TAP, or charging no tuition, or for similar reasons, 104 were included in the exercise: 23 SUNY, 9 CUNY, 72 independent. These are categorized by type in Table 6.

This is the procedure which was followed:

1) For each institution, 1980-81 tuition and required fees, and fall 1980 F-T undergraduate enrollment, was obtained.
2) Estimates of "other costs" were taken from the CSS College Cost Book for 1980-81.

3) Statistics reported in NCES 2300-4: number of aid applicants (undergraduate) by income category, were used to estimate three broad income groups for all full-time undergraduate students, by institution. Taking the assumed averages, an effort was made to "match" these estimates with three groups: low, middle, high. The decision was made to set the following intervals:

low	$ 0-14,999
middle	15,000-32,999
high	33,000 and over

To each was assigned the assumed average income developed from BLS data, as described in the previous section.

4) The proportions of aid applicants for these income intervals, were applied to each institution's total full-time undergraduate enrollment. This assumption that income distribution of aid applicants may be applied to all full-time undergraduate students is used only tentatively until better information is available.

5) For each income level the assumed average TAP award was calculated, by applying Schedule C to NTB for low and middle income students. (Schedule C is in appendix 1, and the NTB's for low and middle income were $10,190 and $22,072, respectively.) It turned out that no middle income students were eligible for even the minimum TAP award so that TAP was calculated at each institution for low income students only.

6) Total Pell grant funds awarded by institution for 1980-81 were taken from the Higher Education Data System. The assumption was made that Pell was awarded only to low income students, as defined in this exercise. Campus-based program aid (and also institutional aid) were assumed to be too small, or to differ too little between sectors to affect net cost indices. Guaranteed Student Loans were not considered mainly because estimation of the value of subsidized interest is a refinement which lies in the future.

7) An "average net cost" figure for each of the three income groups was identified for each institution. This was: tuition and fees, plus other costs, less TAP and Pell (for low income only). A "total average net cost" figures was obtained, weighted by income group size.

8) Average net cost figures for low, middle and higher income groups, weighted by enrollment, were obtained for institutional type, and sector, as shown in Table 6. (A combined figure for the public sectors was also obtained.) Looking at only the public-independent results, "Net Cost Index 2" provides the following results:

Net Cost difference	$4,041
Net Cost ratio	1:2.5
Relative Net Cost index	0.40

Table 6

"Net Cost Index II" Summarized (1980-81)

	Low	Middle	High	Total
Independent				
(5)				
Multiversity	$ 6,813	9,254	9,314	8,332
FTUG	11,651	18,660	8,370	38,681
(6)				
University	$ 4,846	7,198	7,236	6,251
FTUG	15,858	18,576	4,738	39,172
(26)				
College Complex	$ 5,082	7,608	7,812	6,883
FTUG	17,606	28,759	11,675	58,040
(29)				
College	$ 3,381	6,147	6,298	5,054
FTUG	15,439	18,444	4,555	38,438
(6)				
Eng.-Tech.	$ 5,017	7,740	7,841	6,743
FTUG	8,273	13,583	4,649	26,505
(72)				
Independent	$ 4.931	7,587	7,903	6,709
FTUG	68,827	98,022	33,987	200,836
Public				
SUNY				
(4)				
U. Center	$ 2,759	4,239	4,194	3,640
FTUG	16,231	19,517	4,734	40,482
(12)				
U. College	$ 2,181	3,922	3,964	3,322
FTUG	20,527	32,658	5,976	59,161
(3)				
Specialized	$ 2,435	4,162	4,304	3,625
FTUG	1,024	1,804	369	3,197
(4)				
Statutory	$ 1,955	5,437	5,436	4,695
FTUG	1,978	2,637	879	5,494
(23)				
SUNY	$ 2,412	4,110	4,174	3,519
FTUG	39,760	56,616	11,958	108,334
(9)				
CUNY	$ 1,027	2,267	2,267	1,222
FTUG	53,583	9,559	574	63,716
(32)				
Public	$ 1,617	3,844	4,087	2,668
FTUG	93,343	66,175	12,532	172,050

Net cost ratio = pub:ind = 1:2.5
NCI = 0.4
Net cost difference = $4,041

DISCUSSION

This paper has described the development of three indices of net cost of attending college. While noting the preliminary nature of these indicators, the paper has discussed their potential value in identifying changes in the coverage of student aid and explaining changes in enrollment of different groups of institutions.

It is useful to compare briefly the three indices, the manner in which they were developed, and their results. Exhibit 2 summarizes the results for 1980-81. The Tuition Net TAP index is shown for only one of the four years for which it was calculated for three income levels (two of which are the same for 1980-81. It is not possible to combine them into a total summary, as is done for Net Cost Index 2, because calculations were made by sectors rather than by individual institutions.

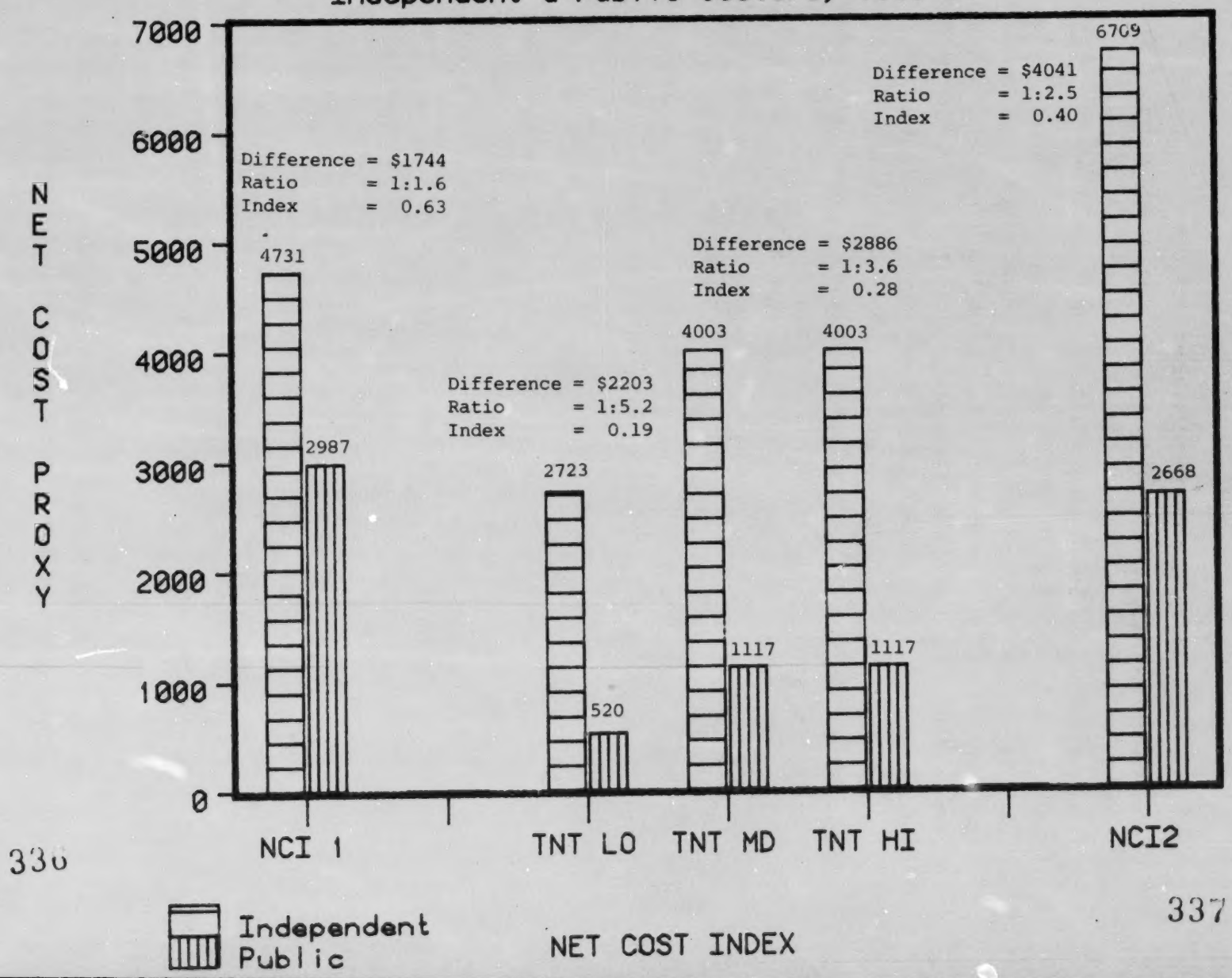
The "average net costs" resulting from Tuition Net TAP are lower than for the other indices as expected, because the only cost considered was tuition. However, the "average net cost" results for the independent sector are lower from Net Cost Index 1 than from NCI 2, while the reverse is true for the public sectors. The reasons for this unexpected result seem to be the following:

- Institutional total tuition and fee revenues for the independent sector in NCI 1 included those from some unknown number of part-time students, because all sources of aid were being considered and part-time students are eligible for Federal aid. When this was divided by the total undergraduate enrollment the resulting tuition and fees charges per student were smaller than would have been the case were only full-time students considered. Of course the same effect would be exerted on the public institutions. Moreover, in NCI 2 assumptions were made that resulted in only low income students receiving TAP and Pell grants. This left about two-thirds (66 percent) of students in the independent sector assumed to receive no TAP or Pell, which in reality may not be the case.
- For the public sector, "average net cost" from NCI 2 is slightly lower than that for NCI 1 mainly because over half the students (54 percent) of the 4-year SUNY and CUNY campuses included were entitled to TAP and Pell, again based on the various assumptions made for this exercise.

EXHIBIT 2

"AVERAGE NET COSTS"

Independent & Public Sectors, 1980-81



The public/independent net cost gaps and ratios and indices shown in Exhibit II illustrate the kinds of statistics one might want to track over time and compare with changes in enrollment shares. They would be particularly valuable if an index could be developed that was comprehensive in terms of the costs and student aid it included.

SUMMARY AND CONCLUSIONS

Three indices of net cost of college attendance have been described in this report. None of them provides a satisfactory estimate of net of attendance, but the preliminary results shown in this report suggest that extensions and refinements of the general approach would be extremely valuable to planners and policy makers at both the state and institutional levels. Plans for such extensions are now being developed by the New York State Education Department.

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STUDENT COLLEGE CHOICE AND DECISION-MAKING

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The process of choosing a college has received increasing attention with the emergence of the use of "marketing" in higher education, and the realization that the aggregate pool of traditional age college students will be decreasing during the next 20 years.

The literature contains a significant number of articles and research studies dealing with the complex decision process each student must use in deciding to go to college, in deciding which colleges to apply to, and finally, in deciding which college to attend.

Chapman writes that even with the intense competition for students,

> "... many colleges have persisted in the belief that they can affect students' choice of college merely by modifying their institutional descriptions or the targeting of their recruiting. Few admissions officers operate from a systematic model of the influences on student college choice. Lacking such a model, colleges may overlook ways to increase the effectiveness of their recruiting or, conversely, overestimate the influence of recruiting activities in which they do engage." (Chapman, 1980:490)

Most of the research reported has been aimed at finding out which of the many factors students consider are the most important and influential in the college choice process. Maguire and Lay (1980) have shown that the perceived improvement of seven attributes (financial aid, parents preference, specific academic programs, size of school, location, athletic facilities, and social activities) can be expected to create an increased enrollment yield for Boston College. A recent study of high school seniors in Arizona (Cibik, 1982) has shown that only eight college information items (quality of programs, cost, career options, financial aid, helpfulness of instructors, how classes are taught, availability of housing, and admissions requirements) were listed as "of great importance" by over 40% of the students surveyed.

A college is never going to be able to meet the needs of every potential student. But it is one thing to lose a potential student because

per year), location, and ease of entry are the only concerns of potential students. However, it would be encouraging to think that our academic reputation, quality of faculty, and comprehensive academic support center were integral factors influencing students to enroll at Northern Essex CC.

The essential questions that I felt needed to be answered to provide Northern Essex CC with the data necessary to start constructing a long range enrollment planning strategy were:

1. What are the factors or aspects which influence students to apply and ultimately enroll at Northern Essex CC?

2. What kinds of information are used or desired by students during their decision-making process?

3. What sources of information are used or desired by students during their decision-making process?

4. How do the non-traditional students differ from the traditional students with respect to the three questions above?

I will report on the results of three studies: a study of the accepted but not enrolled students from the Fall 1980; a study of the factors and sources of information influencing enrolled students entering in the Fall 1981; and, a qualitative case study conducted in the Spring 1982 using in-depth interviews with six students.

I. STUDY OF ACCEPTED BUT NOT ENROLLED STUDENTS

Responses from 250 potential students who were accepted for the Fall 1980 entering class, but chose not to enroll were received. The responses represent 30.0% of all accepted but not enrolled students.

Chart I lists the factors most influential when these not enrolled students were making their final college choice. The five most influential factors were academic programs, distance from home, tuition cost, academic reputation, and financial aid award.

Chart II shows a comparison of the responses of the not enrolled students to the responses of the enrolled students who completed the Cooperative Institutional Research Program (CIRP) questionnaire. The sample of enrolled students was 39.1% of the entering students. Northern Essex was the first choice of 75.6% of the enrolled students, while obviously a back-up choice for those not enrolled at Northern Essex. The not enrolled students were not as impressed with the academic reputation, nor looking for our specific program offerings as were the enrolled students.

the college does not have the institutional characteristics or program of study desired by the student, and quite another to lose a student because of misperceptions or inadequate information. As Clark, Gelatt, and Levine (1965:41) have stated, "although the use of relevant information by no means guarantees the 'right' decision, a 'good' decision cannot occur without it."

Litten and Brodigan (1982) have extended the research to include the media which students prefer to use to obtain the information they need when making their college choice. They state that it can be assumed that there is at least a loose association between the importance of a college attribute in influencing college choice and the value of information about that attribute to the decision-maker.

Litten and Brodigan's study showed conclusively that there were specific message/media linkages that suggest certain types of information may have an edge in being received when committed to certain media as opposed to others. For both students and parents, factual information was generally preferred through impersonal, college originated media. Information which may differ according to a student's personal situation appeared to be preferred from a personalized source directly related to the college. For reputational/prestige information both parents and students tended to prefer a source that was not associated with the college.

Little research has been conducted using other than high school seniors or college freshmen as the subjects. Adults have enrolled in increasing numbers in higher educational institutions as the number of traditional age students have declined. Northern Essex CC has seen the percentage of students over age 24 increase to 25% of its day enrollment. If these adult learners are to be adequately served, institutions like ours must assess their educational needs, information needs, and motivations, understand the differences between adult learners and traditional age students, and make appropriate adjustments in administrative procedures, programming, and the teaching-learning process. (Wolfgang and Dowling, 1981)

Currently at Northern Essex CC (3500 day students, 4700 evening students in the Fall 1982) there is no fundamental strategy being used in the development of a coordinated recruiting plan, marketing plan, publication plan, advertising plan, or longe range enrollment plan. The lack of a comprehensive "plan of attack" has not affected our student demand. Inquiries, acceptances, yield, and enrollment are all at an all time high. It may well be that the economic situation has reached the point where the low cost ($634 tuition

CHART I

INFLUENTIAL FACTORS IN COLLEGE CHOICE *

NOT ENROLLED STUDENTS - FALL 1980

	ALL RESPONDENTS		HIGH SCHOOL GRAD LESS THAN 3 YEARS PRIOR		HIGH SCHOOL GRAD MORE THAN 3 YEARS PRIOR	
	PTS.	RANK	PTS.	RANK	PTS.	RANK
ACADEMIC PROGRAMS	455	1	331	1	124	1
DISTANCE FROM HOME	370	2	268	2	102	2
TUITION COST	360	3	266	3	94	3
ACADEMIC REPUTATION	291	4	233	4	58	4
FINANCIAL AID AWARD	121	5	92	5	29	5
SIZE OF SCHOOL	82	6	69	6	13	6
REPUTATION OF THE FACULTY	56	7	46	7	10	7
PARENTS PREFERENCE	42	8	39	8	3	9
STUDENT ACTIVITIES	38	9	31	9	7	8
CONTACT WITH ADMISSIONS	31	10	30	10	1	11
ATTRACTIVE CAMPUS	29	11	26	11	3	9
STUDENT-FACULTY RATIO	27	12	24	12	3	9
MALE-FEMALE RATIO	16	13	13	13	3	9
COUNSELORS ADVICE	12	14	12	14	0	-
HOUSING OPPORTUNITIES	10	15	8	15	2	10

* Points were assigned as follows: 5 points for most influential factor, 3 points for second, and 1 point for third most influential factor.

CHART II

	Total Not Enrolled Fall 1980	Not Enrolled Students High School Graduates 1977 or Prior	Not Enrolled Students High School Graduates 1978 and after	Enrolled "New" Students (CIRP) Fall 1980
Sample Size	250	61	189	709
1. NECC is student's				
a. First choice	32.4	59.3	24.3	75.6
b. Second choice	37.6	27.1	41.3	18.4
c. Third choice	16.8	5.1	20.6	3.5
d. Less than third choice	13.2	8.5	14.8	2.4
2. Concern about financing college				
a. No concern	34.0	37.7	32.3	43.5
b. Some concern	43.2	29.5	48.1	43.4
c. Major concern	22.8	32.8	19.6	13.0
3. Reasons noted as Very Important in deciding to go to college:				
a. My parents wanted me to go	20.8	11.5	23.8	23.7
b. I could not find a job	6.8	3.3	7.9	6.2
c. I wanted to get away from home	3.6	1.6	4.2	2.4
d. To be able to get a better job	66.8	72.1	65.1	78.7
e. To gain a general education	57.8	67.2	54.5	67.3
f. To improve my reading and study skills	36.4	32.8	37.6	42.0
g. There was nothing better to do	2.4	1.6	2.6	2.2
h. To make me a more cultured person	33.2	39.3	31.2	34.1
i. To be able to make more money	62.4	52.5	65.6	65.4
j. To learn more about things of interest	68.8	80.3	65.1	72.5
k. To meet new and interesting people	42.0	37.7	43.4	47.1
l. To prepare myself for graduate school	19.6	21.3	19.0	45.7
4. Reasons noted as Very Important in deciding to apply to NECC:				
a. My relatives wanted me to come here	2.8	1.6	3.2	4.6
b. My teacher advised me	1.6	1.6	1.6	4.9
c. This college has a good reputation	21.6	24.6	20.6	32.7
d. I was offered financial assistance	6.0	4.9	6.3	7.2
e. I was not accepted anywhere else	1.6	1.6	1.6	4.9
f. Someone who had been there advised me to go	14.4	13.1	14.8	18.1
g. This college offers the specific program	37.2	50.8	33.0	25.7
h. My guidance counselor advised me to	8.8	1.6	12.2	13.5
i. This college has low tuition	37.6	44.3	35.4	36.5
j. I wanted to live at home	24.0	29.5	22.2	23.0
k. A friend suggested attending	8.4	6.6	9.0	8.7
l. A college representative recruited me	1.6	1.6	1.6	.8
5. Reasons noted as Very Important in deciding not to attend NECC:				
a. Financial Problems	13.2	26.2	9.0	
b. NECC was not my first choice	23.6	3.3	30.2	
c. NECC is too close to home	3.6	0.0	4.8	
d. Academic program not available	10.8	4.9	12.7	
e. Unsure of career goals	14.0	9.8	15.3	
f. Family or personal difficulties	11.6	23.0	7.9	
g. Moved or moving soon	3.2	8.2	1.6	
h. Transportation problems	11.2	9.8	11.6	
i. Classes not offered at convenient times	4.8	6.6	4.2	
j. Time conflict due to work	10.0	21.3	6.3	
k. Have decided not to attend any school	7.2	14.8	4.8	

The reasons why students decided not to enroll at Northern Essex are quite different for traditional students as compared to those of the older students. Financial problems, family or personal difficulties, and time conflicts due to work dominate the reasons why the non-traditional students choose not to enroll at Northern Essex.

II. STUDY OF THE FACTORS WHICH INFLUENCED ENROLLMENT AND THE SOURCES OF INFORMATION PREFERRED BY NEW STUDENTS

The population sampled in this replication of Litten and Brodigan's work was the Fall 1981 "new" student enrollment of Northern Essex CC. A response rate of 26.3% was obtained from the 1663 "new" students. (A new student according to the Northern Essex data system, is one who was not enrolled in the immediate past semester.) The respondents were 65.5% traditional students, having graduated high school within the past three years. Overall, 64.8% of the respondents did not have any prior college attendance, while only 33.8% of the non-traditional students had not attended college previously.

Chart III reports the most important influential factors in the decision to attend Northern Essex. In order of importance the top eight factors were: costs (low tuition), had desired course of study, quality of courses/ programs, close to home, career improvement, academic reputation, financial aid availability, and variety of courses offerred.

There was only a slight difference in the responses of non-traditional students versus the traditional student responses. This difference was in placing career improvement third instead of fifth for traditional students.

Chart IV shows the preferred sources of information about Northern Essex CC. The preferred sources of information in order of preference were: the college catalog, general knowledge, high school counselor, former students, friends, admissions office, current students, parents, and Northern Essex faculty. As one might assume, the guidance counselor was a much more preferred source for the traditional students, while non-traditional students tended to prefer former students, the admissions office, and faculty to a greater extent. (The question asked the students to list the most "preferred" source of information, but I feel that many students probably responded with the sources of information they "used" in obtaining information they needed about Northern Essex.

Chart V reviews the rankings of all 21 items listed on the questionnaire as possible influential aspects of the college. It is interesting to note

CHART III

MOST IMPORTANT INFLUENTIAL FACTORS *

ENROLLED STUDENTS - FALL 1981

	ALL RESPONDENTS		RESPONDENTS OUT OF HIGH SCHOOL LESS THAN 3 YEARS		RESPONDENTS OUT OF HIGH SCHOOL MORE THAN 3 YEARS	
	Points	Rank	Points	Rank	Points	Rank
COSTS (LOW TUITION)	846	1	574	1	272	1
HAD DESIRED COURSE OF STUDY	671	2	412	2	259	2
QUALITY OF COURSES/PROGRAMS	457	3	298	3	159	4
CLOSE TO YOUR HOME	418	4	279	4	139	5
CAREER IMPROVEMENT	374	5	198	5	176	3
ACADEMIC REPUTATION	227	6	152	6	75	6
FINANCIAL AID AVAILABILITY	180	7	135	7	45	7
VARIETY OF COURSES OFFERED	141	8	106	8	35	8

CHART IV

PREFERRED SOURCES OF INFORMATION *

ENROLLED STUDENTS - FALL 1981

	ALL RESPONDENTS		LESS THAN 3 YEARS OUT OF HIGH SCHOOL		MORE THAN 3 YEARS OUT OF HIGH SCHOOL	
	Pts.	Rank	Pts.	Rank	Pts.	Rank
CATALOG	1869	1	1132	1	737	1
GENERAL KNOWLEDGE	1167	2	639	3	528	2
HIGH SCHOOL COUNSELOR	863	3	810	2	53	11
FORMER STUDENT	677	4	374	8	303	3
FRIENDS	657	5	446	4	216	5
ADMISSIONS OFFICE	614	6	378	7	236	4
CURRENT STUDENTS	608	7	445	5	163	7
PARENTS	506	8	428	6	78	10
NECC FACULTY	446	9	242	9	204	6

* Points were assigned as follows: 5 points for the most influential factor, 3 points for second, and 1 point for third most influential factor.

CHART V

MOST IMPORTANT INFLUENTIAL FACTORS *

ENROLLED STUDENTS - FALL 1981

	ALL RESPONDENTS	LESS THAN 3 YEARS OUT OF HIGH SCHOOL	MORE THAN 3 YEARS OUT OF HIGH SCHOOL
COSTS (LOW TUITION)	1	1	1
HAD DESIRED COURSE OF STUDY	2	2	2
QUALITY OF COURSES/PROGRAMS	3	3	4
CLOSE TO HOME	4	4	5
CAREER IMPROVEMENT	5	5	3
ACADEMIC REPUTATION	6	6	6
FINANCIAL AID AVAILABILITY	7	7	7
VARIETY OF COURSES OFFERED	8	8	8
GUIDANCE COUNSELORS ADVICE	9	9	9
REPUTATION OF THE FACULTY	10	10	11
STUDENT/FACULTY RATIO	11	16	10
SOCIAL ATMOSPHERE	12	11	17
SIZE OF NECC	13	12	13
ATTRACTIVE CAMPUS	14	13	13
RECOMMENDATION OF FRIENDS	15	15	12
PARENTS PREFERENCE	16	14	17
COLLEGE CATALOG	17	19	13
RANGE OF STUDENT ACTIVITIES	18	18	19
REPUTATION OF ALUMNI	19	20	13
STUDENT ACTIVITIES AVAILABLE	20	17	--
HOUSING OPPORTUNITIES	21	21	--

* Ranked in order of importance obtained by assigning 5 points for the most influential factor, 3 points for second, and 1 point for the third most influential factor.

CHART VI

PREFERRED SOURCES OF INFORMATION *

ENROLLED STUDENTS - FALL 1981

RANKED IN ORDER OF IMPORTANCE

	TOTAL	COST	DESIRED COURSE OF STUDY	QUALITY OF PROGRAMS	CLOSE TO HOME	CAREER IMPROV.	ACADEMIC REPUTATION	FIN. AID AVAIL.	VARIETY OF COURSES
CATALOG	1	1	1	1	4	2	3	3	1
GEN. KNOWL.	2	2	5	7	1	1	9	4	9
HS COUNSELOR	3	4	2	4	7	3	2	2	2
FORMER STUDENT	4	6	4	2	5	4	1	9	6
FRIENDS	5	5	8	8	2	5	6	11	9
ADMISSIONS OFF.	6	3	3	6	8	8	10	1	3
CURRENT STUDENTS	7	7	7	2	6	10	8	8	5
PARENTS	8	8	10	9	3	7	9	5	7
NECC FACULTY	9	10	6	5	11	6	6	6	4

CHART VII

GROUP LESS THAN 3 YEARS OUT OF HIGH SCHOOL / OVER 3 YEARS OUT OF HIGH SCHOOL

PREFERRED SOURCES OF INFORMATION *

ENROLLED STUDENTS - FALL 1981

RANKED IN ORDER OF IMPORTANCE

	TOTAL	COST	DESIRED COURSE OF STUDY	QUALITY OF PROGRAMS	CLOSE TO HOME	CAREER IMPROV.	ACADEMIC REPUTATION	FIN. AID AVAIL.	VARIETY OF COURSES
CATALOG	1 / 1	1 / 1	1 / 1	1 / 1	4 / 3	4 / 1	4 / 2	2 / 1	1 / 1
GEN. KNOWL.	3 / 2	3 / 2	3 / 6	9 / 7	1 / 1	2 / 2	9 / 5	4 / 9	8 / 2
HS COUNSELOR	2 / 11	2 / -	2 / 11	2 / 9	6 / -	1 / 6	1 / -	1 / 8	2 / 11
FORMER STUDENT	8 / 3	8 / 4	7 / 2	4 / 2	7 / 5	5 / 5	3 / 1	11 / 5	5 / 3
FRIENDS	4 / 5	5 / 7	9 / 7	8 / 8	3 / 2	6 / 4	7 / 6	- / 3	9 / 5
ADMISSIONS OFF.	7 / 4	4 / 3	4 / 3	7 / 5	11 / 7	7 / 7	12 / 8	3 / 2	3 / 4
CURRENT STUDENTS	5 / 7	5 / 8	5 / 8	3 / 3	5 / 8	8 / 11	6 / 7	6 / 9	4 / 7
PARENTS	6 / 10	7 / 6	8 / 9	6 / 11	2 / 4	3 / 10	5 / -	5 / 8	10 / 10
NECC FACULTY	9 / 6	9 / 9	6 / 4	5 / 4	9 / -	10 / 3	8 / 4	6 / 3	7 / 5

* Rankings obtained by assigning 5 points for the most preferred source, 3 points for second, and 1 point for the third most preferred source.

that items such as parents preference, recommendation of friends, reputation of alumni, and student activities are not considered as important influential factors.

The preferred sources of information for each of the most influential factors are ranked in Chart VI. It is easy to see that when planning to communicate with prospective students, the presentation of the information through the Northern Essex catalog and high school counselors are the most preferred sources.

Chart VII shows the preferred sources of information for the most important factors for traditional students and non-traditional students separately. The sources which differed in ranking by more than four have been circled to call attention to the most glaring differences. The matrix has 72 items, and there are 22 cases of a ranking differing by more than four.

III. QUALITATIVE CASE STUDY

The data for this study was collected through in-depth interviews held with six full-time students who entered Northern Essex in the Fall 1981. The interviews were held during the Spring 1982 semester. The general interview guide approach and purposeful sampling strategy were utilized.

These students first decided to go to college at various points in their life. The more traditional students decided to attend college right after high school:

> It was my senior year in high school and the reason that I decided is that year was the first I ever did that well in high school. I never really thought I had the ability to do it, and that's when I decided I wanted to go onto college. (Doria A.)

The non-traditional students decided to attend college after some other experiences in life:

> I realized that I wasn't going to make any money if I didn't go to college. I had tried every line of work. I was uneducated. I didn't complete high school. I knew I could get a GED, but I was undereducated and I could see that it was sewn up economically. I had stopped traveling and decided to stay in one place for a while, and I wasn't going to climb any social scales without an education. (Tim C.)

The college choice decision-making process that some of the students used was very logical and well-organized:

> I put a little more into the decision because I figured it would influence, you know, it was a big step in my life. I like to learn but I don't like to put the time in, I'd rather be out working, and

> I liked the fact that I would go here for just 2 years and then get out. The location and the curriculum were what I wanted, and I liked the course descriptions... (Lisa B.)

The reasons why students wanted to attend college were dominated by economical concerns:

> I hadn't worked in about nine years. And, in trying to compete in the job market with the youngsters that are out there today I didn't stand a chance. I was too far behind things...so I figured this was the chance... (Marion C.)

Other benefits of college attendance were also found to be important:

> The way people are today I think its 50/50 between personal growth and financial growth... (Tim C.)

The influence of "significant others" can many times affect the college choice decision process:

> One gentleman I know that went here really respected the fact that there were small classes and he got the extra attention that he needed... I never expected him to go to college, much less do as good as he did. (Ken A.)

The strengths as perceived by current students are the factors that should be communicated to future students. It was interesting to find a large amount of relatively intangible strengths expressed by the students:

> Well, for one thing I appreciate the attitude of the people who work here. I have never met anyone here in any position who has a negative attitude. There is always somebody who gets you an answer and that means a lot. I think they ought to hang a sign up that says the "Buck Stops Here" and place it above everybody, because that is the way it works around here. (Marion C.)

> I like it because I can get on a personal level with the teachers, whereas at a bigger college you might never see a teacher, or you would not get that extra help you need. I think the faculty are like an A+. All the teachers I have had have just been tremendous. (Ken A.)

Historically, community colleges have been the model in meeting the needs of the educationally underprivileged who have chosen to attend college without an appropriate college preparatory program. The community colleges have given them a chance for success. This model appears to be alive and well at Northern Essex CC:

> Everything that I thought made a good excuse not to go got shot down. I thought that when I came over here and said how can I afford to go to school the financial aid office was going to say you put up so much and we will put up so much... I never dreamed that there was a Pell Grant program that would pay all my tuition bills. (Donna H.)

> I had never seen a college before, and I thought to myself, well here I'll be in a class with 4-5 other old biddies and we can sit there and yak and see what's what, but it was so different, and it has given me

> a whole new outlook on life, a way to fill up all that time and put it to good use... to go someplace alone was a big step to me, I don't think I would have come to school if it hadn't been for my son taking classes along with me... (Marion C.)

SUMMARY

The important factors and aspects of Northern Essex CC which influence students to apply and enroll are the cost (low tuition), academic programs, distance from home, academic reputation, and financial aid availability. The most preferred source of information for four of these five influential factors was a different medium.

Overall, the most preferred sources of information about Northern Essex CC were the college catalog, general knowledge, high school counselor, former students, friends, the admissions office, current students, parents, and faculty. Each of these sources was ranked at least third in preference for at least one of the eight most influential factors. These results indicate that for Northern Essex CC to be successful in the dissemination of information about its strengths and characteristics, a coordinated, multi-media approach must be implemented.

While the important influential factors are the same for traditional age as well as non-traditional age students, their preferred sources of information are quite divergent. Traditional students prefer to use the catalog and high school counselor as their sources of information. The non-traditional students prefer to use the faculty, former students, and the admissions office as a source of information. These results would indicate that each student should receive a catalog for their review, and that a segmented marketing approach is needed to effectively meet the informational needs of both the traditional and non-traditional students.

General knowledge appears to play a very important role as a source of information. Non-traditional students rank this item generally higher than do traditional students. I believe this response is due to the assimilation of bits of information from a variety of sources over time, especially the Division of Continuing Education brochure which is mailed to all area households three times a year. The importance of general knowledge as an information source supports the contention that the college should be active in the community as a way of increasing its visibility.

The concern for individuals as shown by the faculty, staff, and other students is also a major factor in the attraction of future students. Many times we tend to forget that by meeting the personal needs of individuals, we will be encouraging an atmosphere that will result in a positive educational experience.

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CARVING UP PARADISE: POLITICS, DATA AND THE ALLOCATION OF ACADEMIC SPACE

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The allocation or reallocation of academic space on a campus is a political and rational activity. It is rational in the sense that a specific square footage is assigned and programs occupy what is assumed to be intelligent utilization of available resources. But that is the lesser aspect of the issue. In my mind politics dominate the decision making process. Like it or not one is faced with the reality that the effective utilization of space, a key institutional resource, is dependant on political factors. Institutional researchers and physical plant administrators need to sharpen their political skills if they wish to play an important role in assisting their institutions in dealing with the 1980's.

The Problem

The enrollment squeeze, long promised by planners and demographers, is beginning to take its toll. At the same time the United States is passing through a period of economic stagnation and the economic value of a bachelors degree is being questioned. These factors, taken together, suggest that little additional space will be built on America's campuses over the next decade. Those institutions most injured by this emerging situation may need to lock up space. This cutback, this change in mindset, this new era of constraints necessitates more effective thinking. The political stresses produced by this down-turn in the economy of higher education makes the politics of space critical. In the past it was often possible to "buy" one's way out of a difficult space situation.

The new building, the major rehabilitation, or the opportunity for other resources reduced the sense of scarcity and competition. This brief description of the current situation presents nothing new but the context is critical for coming to grips with the politics of space.

So what? If conditions hold or continue to decline, institutions must have full control of their resources. They need to have flexibility in the utilization of resources if planning is to have any meaning. Institutions, in terms of physical space, need to break the emotional grip of perceived ownership. Space must take on the characteristics of any other operating resource. There are already enough factors present in the higher education environment which can produce ill will, alienation, and intra-organizational warfare. Space should not add to institutional stress, at least no more so than any other essential resource.

We must also remember that faculty come to an institution of higher learning to pursue their careers because they view it as a form of professional paradise--a place where personal interests can be pursued and avocations become vocations. It is also a place where they exchange net income for flexibility and life style; a place where ideas and their exchange produce a personal sense of growth and intellectual excitement. But faculty members can be easily drawn into long term squabbling over physical space. Is this understandable? Of course. Space represents program legitimacy, program strength, quality of life, and institutional commitments. Reducing, changing, or refining the space of an academic department can be viewed as a direct threat to that department's vitality, now and in the future. Thus the entire process of managing academic space is fraught with politics, emotions, and conflict. If handled poorly the political chaos associated with space decisions can result in paradise lost.

Organization Facts

I would like to review some basic assumptions about the way organizations function. Organizations are basically political and emotional, not rational. (Wildavsky, 1979: ch.2) Decision making processes are slow and incremental, based on past events and decisions, seldom moving from a blank sheet in a systematic way toward a new set of conclusions. (Lindblom, 1965: ch.3) Individuals within organizations tend to respond negatively to stress and change while, at the same time, it is essential for an organization to be responsive to its working environment. (Etzioni, 1964: 98) At the same time organizational techniques and process must respond sensitively to organizational reality and employee stress if they are to be effective. Unfortunately colleges and universities are not always the collegial entities as we often suggest; they are like all large complex organizations. Finally it is clear that the management of change in a professional organization is one of the most challenging of management activities, particularly when change is on the down side. (Etzioni, 1964: 83) Taken together these brief thoughts about organizations reinforce the idea that planning for space allocation needs to be managed carefully with full recognition of its political content.

Space and Facilities Facts

It is simply a truism that academic departments never have enough space. Recently we dealt with a department which had, according to formula, more than double the space to which it is entitled. After careful inspection, a walking tour of the space, and hours of discussion their conclusion, to our dismay, was to ask for an additional 500 square feet. This outcome of an attempt to approach the issue rationally is not uncommon.

Formulas tend to be of little value in working with academic departments. SUNY has an excellent space entitlement formula that accounts for the following factors: lower division enrollments, upper division enrollments, beginning graduate enrollments, advance graduate enrollments, faculty FTE, general instructional space, classroom labs, individual labs, research space and support space, and faculty office space. (Office for Capital Facilities, 1979) Factors have been generated for each of the resulting cells (see below). Whenever this formula is utilized in a discussion with an academic department it only produces heated argument. This has resulted in our discontinuation of its use as a negotiating tool.

Department X: Space Factors

	Lower Div. FTE	Upper Div. FTE	Beginning Graduate FTE	Advanced Graduate FTE	Advanced Graduate HEADS	Faculty FTE
General Instruction						
Classroom Labs						
Individual Study Labs						
Research and Support Space						
Office Space						
TOTAL	____	____	____	____	____	____

Of course different departments have different space needs. And a single discipline, depending upon its focus and its pedagogy, can have different space needs at different institutions. This adds to the inability to utilize standardized formulas. Formulas do have a value; they identify areas and disciplines which need careful study. They also allow one to identify classes of space needing attention. At best one can use

them to establish ordinal rankings of departments which are overspaced. Yet experience has made it clear to me that formulas are of little value in dealing with the automatic opposition one encounters when attempting to reduce or redesign the space of academic departments.

The Challenge

This brief review of the realities of space allocation results in a potentially frustrating situation. Institutions need to count on space as a flexible resource supporting new directions and needs. At the same time the logics of organizations and the realities of space make it extremely difficult to exercise managerial authority. This is particularly true in universities and colleges because the key actors are the professional members of the organization. The organization behavior literature is filled with examples which highlight the difficulty of managing a professional organization wherein the employees feel that administration has only one purpose--to provide adequate resources for the professionals to function. Thus the administration lacks basic authority for pursuing institution-wide priorities. (Etzioni, 1964: 81-85)

How do we deal with this? Is it impossible then to manage physical space without creating organizational chaos? Can we change paradise without creating paradise lost?

At SUNY-Binghamton we have considered this issue carefully and have, over the past eighteen months, significantly altered our approach to space planning. We have done this because we are in the fortunate position of being a growing campus. Enrollments are increasing, resources are increasing, and programs are being added. Most recently we have received approval to add engineering programs. However, we cannot expect any

additional buildings. Thus we are deeply involved in the problem and have to wrestle with the challenge. We have no choice.

Our challenge is to move forward within a fixed amount of space to meet our goals. More importantly, we must do this without creating unnecessary organizational stress.

An Approach to Consider

The following information describes the revised approach to physical space decision making we have adopted.

1. Redefinition of Space: Fundamental to the reorganization of a space allocation process was a redefinition of space. At a widely attended Presidentially-chaired retreat the concern for space was discussed at length. From this came a clear message that space is a university resource and, like all resources of the university, subject to control, accountability, and review. It was also made clear that space allocation would be based upon programmatic need and that programmatic need would have to be carefully proven.

2. Restructuring the Decision Making Process: A new space advisory committee was formed which reports directly to the president's staff and serves as a working subcommittee of that group. The membership is composed of four higher level managers, mostly assistant vice presidents, and the director of physical plant, a key member. The space advisory committee has an advisory role only, forwarding recommendations to the president's staff for consideration. The committee meets regularly with the president's staff to discuss these recommendations and it is the staff which makes the final decisions. Naturally these decisions are somewhat broad-brush in nature but they represent university decisions taken at the highest level. The space advisory committee does have some discretion in

its implementation of these decisions but proceeds with a mandate from the president's staff, free of lingering political questions.

3. Consultation Process: In preparing recommendations for the president's staff the space advisory committee engages in an extended consultation process. This process is always referred to as information gathering. It is in this process that programmatic needs are clarified. Naturally the committee has a sense of where it is headed because of its regular interaction with the president's staff. Often the president's staff will indicate that a specific problem is to be solved or project to pursued. One recent example was a request from president's staff for the space advisory committee to locate appropriate space for a small faculty/staff dining room. In this effort a number of alternative locations were explored without consultation by reviewing large blueprints of various spots on campus. After an initial proposal was reviewed the president's staff gave the committee permission to begin the consultation process.

The factors which were considered as part of this consultation process were: the needs of the program being impacted, the pedagogical style of the program, the building constraints, the tradition and history of the building's occupancy, the political roles of the people involved, the size of the program, the external funding of the program, its research foci and future, the costs of various approaches, and the interests of all constituencies involved. This resulted in a need to consult with secondary groups such as graduate student organizations, student leaders, faculty leaders, food service experts, and anyone else who had an interest in the particular issue.

As a result all factors which stood in the way of this project were brought into the decision making process. Areas that were sensitive were

highlighted and specific needs accommodated. This entire process also had the intended and important tangential impact of informing the academic community of a pending decision. Clearly little hard data were utilized. However the institutional research office was essential in that it supplied an absolutely precise picture of the involved department. This information allows the committee to force all participants to deal with the facts in a common manner. (This eliminates the ability for a person to assert that a program is growing significantly; a quick reference to information provided by institutional research would indicate the actual facts, in detail.) It is here that data are critical, yet they are clearly a backup to the focus on the political issues.

As this information was being gathered, points of opposition and active opponents to the concept were identified. This allowed for careful consultation and discussion with the opinion leaders involved. This process reduces unexpected political problems at the implementation stage. This also allows a careful shaping of a recommendation for the president's staff free of undue political costs.

4. Recommendation: After the extended and detailed consultation process the space advisory committee is then capable of providing a two-part recommendation to the president's staff. The first part of a recommendation is the physical layout of the proposed project. Configuration, square footage, location, and design features are presented for review and approval by the president's staff. This allows the staff to add its comments and refinements to the facility under consideration. The staff can also be informed of the special interests and needs of the involved parties and the subsequent impact upon design configuration and cost.

The second part of recommendation is perhaps more critical. Here the space advisory committee makes comments and suggestions concerning the political and organization implications so that an implementation plan can be prepared to address the human dimensions of the problem. This allows the staff to offer political advice and to determine whether or not it should become involved for the purposes of assuring agreement, obtaining support, and containing conflict. At this time it is also possible to discuss funding if necessary.

The outcome is a clear directive from the president's staff to proceed on a project within clear parameters sensitive to the organizational and political factors involved. Space needed for a specific function or project is identified and leads to a specific allocation process described below.

5. Allocation: The space advisory committee proceeds to secure final refinements of the recommendation and then communicates that recommendation to the affected parties in writing. All specifics and agreements are layed out and made part of the record. Critical to this is the concept of university development space. Under this concept allocations of space are considered temporary. A program or project which receives reconfigured or reduced space is assigned that space under the aegis of university development space. This quasi-contract makes it clear that space is a university resource and that the space is being assigned to the department or unit for a specific period of time for a specific purpose with the proviso that after one or two years this assignment will be reviewed. This scheduled review insures that usage remains appropriate, that the decision was reasonable, and that the affected department has a clear opportunity to request reconsideration of its space allocation. It maintains flexibility for all involved parties.

6. Implementation: The space advisory committee then proceeds to activate all necessary parties, particularly the physical plant. Working within the clear purposes and parameters set by the president's staff, the committee retains minor flexibility in design features. This insures that departments will feel that they have a legitimate and meaningful impact on the final design of their space. Sometimes it is necessary to reject a department's suggestion because of cost or incompatibility with building configuration. But these disagreements are resolved in open and frank discussions where each party presents the facts it feels addresses the question. The space advisory committee has the advantage of working to implement a university decision, backed by the highest level of authority, which has been made clearly, openly, and with appropriate consultation. This reduces implementation costs and speeds the process. Certainly this does not always go smoothly but it greatly reduces the level of political stress.

Conclusion

The process I have described is systematic, understandable, and efficient. It relies on discussion, consultation, and compromise whereas hard facts play a minor but critical role. It is clearly evident that the decision making process is sensitive to the political dynamics of the institution. It allows all concerned parties to have an appropriate voice in the process; no one group or individual is able to dominate the decision making process. At the same time it does not erode or undermine the authority of the senior administration. The process is responsive to the specific programmatic needs of departments as well as being sensitive to the needs of the total institution as it looks towards the future. By increasing both the political content and the consultation level, the

process actually decreases the political costs by avoiding unworkable decisions. It also assures that departments will feel that they have had a legitimate opportunity to influence a decision. Although a department may not obtain its desired outcome it cannot assert that it has been kept in the dark.

Because it is systematic and open and will be the ongoing mode of operation, the academic community has come to understand that this will be the modus operandi for space decisions. Just as departments understand how promotion and tenure decisions take place they now understand how space decisions take place. This regularization of the process is terribly important in that it reduces any concerns for unilateral decision making and assures that departments know when and how they can appropriately influence a decision. We have found this approach to be much more workable than previous processes and to add legitimacy to the space allocation process.

Universities and colleges can indeed be paradises for those who work there. But maintaining that sense of organizational harmony and vitality is a difficult and delicate process. Thoughtful and informed administrators can guide institutions through the difficult days ahead without producing paradise lost.

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ENROLLMENT PROJECTION MODELS: SEEKING EFFECTIVE PREDICTOR VARIABLES

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ENROLLMENT PROJECTIONS AND THE ACADEMIC BUDGET PROCESS

Northeastern University is a private University founded in 1898 and located in Boston, Massachusetts. The total full and part-time enrollment during 1981-82 for its ten undergraduate colleges and eight graduate schools was in excess of 45,000 students. Although the University has experienced a small overall decline in enrollments during the last two years, it has remained in a strong financial position.

The annual budget process at Northeastern can be characterized as a traditional, iterative bottom-up approach. Due to the fact that the endowment fund is quite small, the University is extremely dependent on student generated revenues. The process starts in September after the freshmen admission goals are established for the next fiscal year and it is usually finished by February after one or more rounds of adjustments.

In late September, a three year enrollment projection is developed by the Office of Institutional Research in conjunction with the deans. This projection reflects the group's view of the most likely enrollment levels, given certain assumptions regarding the expected student attrition rates, the ability of the Admissions Office to meets its goals, and regional/national enrollment trends.

During October and November, the department chairmen develop budgets that reflect their financial needs in light of the projected enrollments and their academic goals. After these budgets are reviewed and approved by the appropriate dean and vice president, they are consolidated and submitted to the president for approval.

Concurrently, the Finance Office develops its revenue projections for the next fiscal year. Traditionally, their projections reflect a more conservative view of future enrollments than ours.

It is clear that the revenue projections developed by the Finance Office are an overriding constraint in the process. A planned deficit budget would probably not be accepted by either the president or the trustees. In past years, the original budget requests have had to be re-negotiated with the deans because in total they exceeded the projected revenues. This situation is inherent with the bottom-up budget approach.

Prior to 1977, the establishment of the revenue projections was very much in the domain of the financial administrators and reflected the conservatism of the profession. Our original forecast model was the first attempt to temper this conservatism which created large budget surpluses combined with scheduling and staffing problems in the academic departments at the beginning of each academic year. Invariably, the number of students enrolling each fall was larger than the number used for budget preparation. The parallel existence of the model did in fact result in a smaller variance between budgeted and actual enrollments during the last three fiscal years.

MODELING CONSIDERATIONS AND ENROLLMENT PROJECTIONS

Criteria for Model Evaluation

Forecasting should promote better decision making in organizations. Consequently, it is appropriate to consider the organizational and pragmatic aspects of forecasting as well as the technical aspects before commencing model building[1]. In this section we discuss the impact of several important factors on the choice of model type, model variables, and data sources. These are: accuracy-cost trade-offs, timeliness, model comprehension, and implementation.

The level of accuracy of a forecast should be appropriate to the decisions supported by that forecast. Trade-offs must be made between inexpensive forecasting models which yield large forecast errors and more costly models yielding better precision.

The concept of timeliness can be captured by noting that early computer-based weather forecasting systems required greater than twenty-four hours to produce tomorrow's forecast. Forecasts must be available in sufficient time to make decisions about activities which occur during the forecast's planning horizon.

A technically complex model may produce an accurate forecast, but be totally incomprehensible to the user. A conceptual understanding of the model by the manager is essential. Only in this way can a model-produced forecast benefit significantly from the subjective judgment of the experienced manager, as suggested by Jenkins (1982).

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[1] A most relevant paper which addresses the issues of forecasting in an organizational setting is that by Gwilym W. Jenkins (1982).

Implementation is a multi-faceted problem. It requires the support of the users as well as a technically well-devised forecasting system. Deficiences in technical design may diminish the value of forecasts, but uncooperative users totally emasculate their usefulness. Implementation must begin very early in the model development process to insure success (see Jenkins,1982).

Data availability is a key factor in producing timely forecasts. Traditionally, efforts to forecast college enrollments have focused on demographic data in defining predictor variables. When our forecasting effort began several years ago, we focused on these same data since they were available in a reasonably timely fashion.

Implications for Model Development

In light of the previous discussion, we may now sketch the type of forecasting model and model development process which was pursued.

The "optimal" model type had to be at a technical level which could be explained to administrators on a meaningful conceptual basis. This implied minimal mathematical complexity. To produce an appropriately precise forecast, the model should also explain a large fraction of the inherent data variability. Also, the model should produce forecasts in a cost effective manner. Multivariate linear regression analysis meets all of these requirements and is the technique which was ultimately selected.

To minimize the size of the required data base, high school enrollment data from as few states as possible were considered. As described below, we focused on eight states selected after an analysis of enrollment patterns.

The model development team was cross-functional, possessing expertise in model building and extensive knowledge of university operations. In addition, the Office of the Dean of Admissions was involved in the process at an early stage.

MODEL DEVELOPMENT

Review of Literature

The literature on enrollment forecasting divides into two major categories: (1) extrapolation and causal models based on "hard" data, usually demographic, and (2) more recent prediction models based on survey data, usually student perceptions of university characteristics. When our forecasting effort started, the latter category was embryonic. Of necessity, we looked to the former type of research effort for guidance. Most of the work done was of a more macro nature than ours. Often, predictions were made for the entire country or state school system, rather than one school, thus providing much latitude for absorbing the impact of forecast errors. Since much of the literature which helped launch our effort is now quite dated, only the major works will be briefly cited, as much to provide historical perspective as to establish the credibility of our approach. Our work has now evolved into the second category of research after a worthwhile learning experience.

Goldberg and Huang (1977) provide a review and classification of some of the earlier enrollment prediction models. The works by Lin (1968) and Oliver and Hopkins (1972) develop extrapolation models using cohort survival methods for state school systems. The paper by Banks and

Hohenstein (1970) reports on a collection of models for the state of Georgia using regression analysis with demographic data and economic indices as predictor variables. Another effort using regression analysis applied to variables such as high school graduates, economic indices, and national census data is the paper by Wasik (1970). The models produce forecasts for community college enrollments.

Several difficulties are encountered when attempting to apply the works cited to the design and operation of an an enrollment system for a large, private, urban institution, such as Northeastern University. First, most work addressed the problem at the state or higher level of aggregation. Forecasting of freshmen matriculation, the component of total enrollments with the most uncertainty associated with it, was not adequately treated. None of the models was designed to become part of an ongoing forecasting system to support decisions. Finally, the implementation of these models into the decision-making process was nil.

The last several years have produced some noteworthy papers dealing with the analysis of the college choice process. Not surprisingly, these papers have a decidedly marketing research ring to them, being concerned with topics such as the university's image, the best media for transmittal of different types of information, and targeting subsets of the prospective student population. Brief mention is made of the most thought-provoking recent papers in these areas.

Krampf and Heinlein (1981) discuss ascertaining the university's image using 23 attributes of the institution and relate this to the probability of matriculation. Maguire and Lay (1981) analyze the college choice process identifying 14 predictors of matriculation. Using a different

approach, Lay et al. (1981) apply AID (Automatic Interaction Detector) to divide applicants into subgroups of varying yield based on attributes such as SAT scores, high school rank, and sex. The paper by Litten and Brodigan (1981) investigates sources students and parents each prefer for various types of information about a college.

The latter body of literature has provided guidance to our recent efforts to understand the role of student perception in the recruiting and admissions process. Discussion of some tentative results of this work are contained in the last section of this paper.

Selected Modeling Approach

In light of the factors discussed in the previous section and the guidance provided by the literature review, it was decided to use multivariate linear regression analysis in conjunction with demographic variables to develop a freshmen enrollment forecasting model. After some preliminary evaluation, we focused on high school graduates as the single most valuable predictor variable. Since 86% percent of Northeastern University's freshmen come from New England, New York, and New Jersey, we used only these states.

Since the budget process begins in September, the timing requirements for forecast data are as follows. We desire a forecast for entering freshmen in the Fall of year t to be available in the Fall of year t-1, and based on projected high school graduates for June of year t. Therefore, high school graduate data for June of year t-1 must be available by the Fall of that year to minimize the age of the data used in projecting high school graduates.

The forecast was developed in two steps: (1) extrapolate high school graduates for the eight states using a predictive equation which is a function of time, and (2) forecast Northeastern freshmen using a predictive equation which is a function of some or all of the high school graduates of the eight states. All of these equations were developed using stepwise regression algorithms.

More succinctly we can write:

(1) $HSG_{i't} = f_i(T)$

(2) $NUF_t = f(HSG_{1't}\ HSG_{2't} \cdots HSG_{8't})$

where:

$HSG_{i't}$ = projected high school graduates for state i, year t

NUF_t = forecast for N.U. freshmen for year t

Using these equations a fore ast is produced for each year of a four year planning horizon.

The data base used for both of these projections consists of the years beginning 1967 to the year preceding the forecast. Forecasts were begun in 1977[2]. This provided periods of reasonably well-behaved data for 1967 through 1977, 1967 through 1978, on up to 1967 through 1981, from which to derive our forecasts. It should be noted that foreign students were not included in the data base, and hence not in the forecast. Thus, approximately 8 percent of the entering freshmen required estimation by some other means.

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[2]Early development work was performed by Ramasubramanian (1979) in conjunction with a master's degree thesis.

Selecting the "Best" Model

A stepwise regression algorithm was employed to derive the best set of predictive equations. The MINITAB statistical analysis software package was quite adequate for this purpose since the size of the data base was modest.

The HSG projections as a function of time were obtained as follows. Terms of the form t, t^2, t^3, t^4, sin(wt), sin(2wt) and sin(3wt) were offered to the stepwise algorithm. The criteria for selecting the "best " equation are the standard error of estimate (SE), and the coefficient of determination (R square). In most cases R squares in excess of 0.95 were achieved with SEs of a few hundred students, where typical enrollments were in the tens or hundreds of thousands. A predictive equation was developed for each of the eight states for the five forecast data periods (1967-1977 through 1967-1981).

In developing the NUF predictive equations, actual high school graduates for all states for a given year were paired with entering N.U. freshmen for that year for each of the five forecast data periods. Terms offered to the stepwise algorithm were of the form: HSG, HSG^2, and the natural logarithm of HSG. The same criteria were used to select the best equation as above. R squares ranged from 0.93 to 0.99 and SEs from 54 to 94 students. The coefficients, R squares, and SEs for these equations are shown in Table 1.

In any time series analysis using regression techniques one is concerned that the fundamental assumption of lack of serial correlation of the errors is satisfied. For all equations, the Durbin-Watson statistic was evaluated (Draper and Smith,1981). In nearly all cases, the hypothesis

of zero serial correlation could not be rejected. Where significant correlation was found, the Hildreth-Lu procedure was applied in an attempt to improve the fit to the data (Pindyck and Rubinfeld, 1976). No significant improvements were found.

Table 1

Predictive Equations for NU Freshmen

Forecast Data Period	Equation*	Standard Error of Estimate	Coefficient of Determination
1967-1977	791.6 +0.1904CN +0.0513MA +0.06887NJ	54.0	0.93
1967-1978	-0.2566CN +0.06954MA +0.09041NJ	81.0	0.99
1967-1979	2700.3 -0.059MA +0.3015NH +0.02626NJ	73.0	0.94
1967-1980	3143. +0.0889ME -0.05529MA +0.3424NH	82.0	0.94
1967-1981	0.2169NH +0.04182NJ $-0.0001562CN^2$	94.0	0.99

*State abbreviations:

CN Connecticut ME Maine MA Massachusetts
NH New Hampshire NJ New Jersey

The usefulness of the point estimates provided by the equations could be enhanced by using confidence intervals. Since the independent variables for the NUF equations (ASG for the selected states) are not known with certainty, but probabilistic estimates themselves, this uncertainty must be included in any confidence interval developed for NUF. Such confidence intervals cannot be derived analytically, since the distribution of the forecast variable is derived from the product of normally distributed variables (Pindyck and Rubinfeld, 1976). An approximation for the 95%

confidence interval may be obtained by computing the NUF 95% confidence interval for the expected value of HSG plus 2SE and for the expected value of HSG minus 2SE for each state in the equation, and then using the union of these two confidence intervals to approximate the 95% confidence interval for NUF. This approach results in the confidence intervals displayed in Table 2. Figure 1 plots the actual NUF for the years 1967 through 1982 and the confidence intervals developed from three forecast data periods: 1967-1977, 1967-1980, and 1967-1981.

Table 2

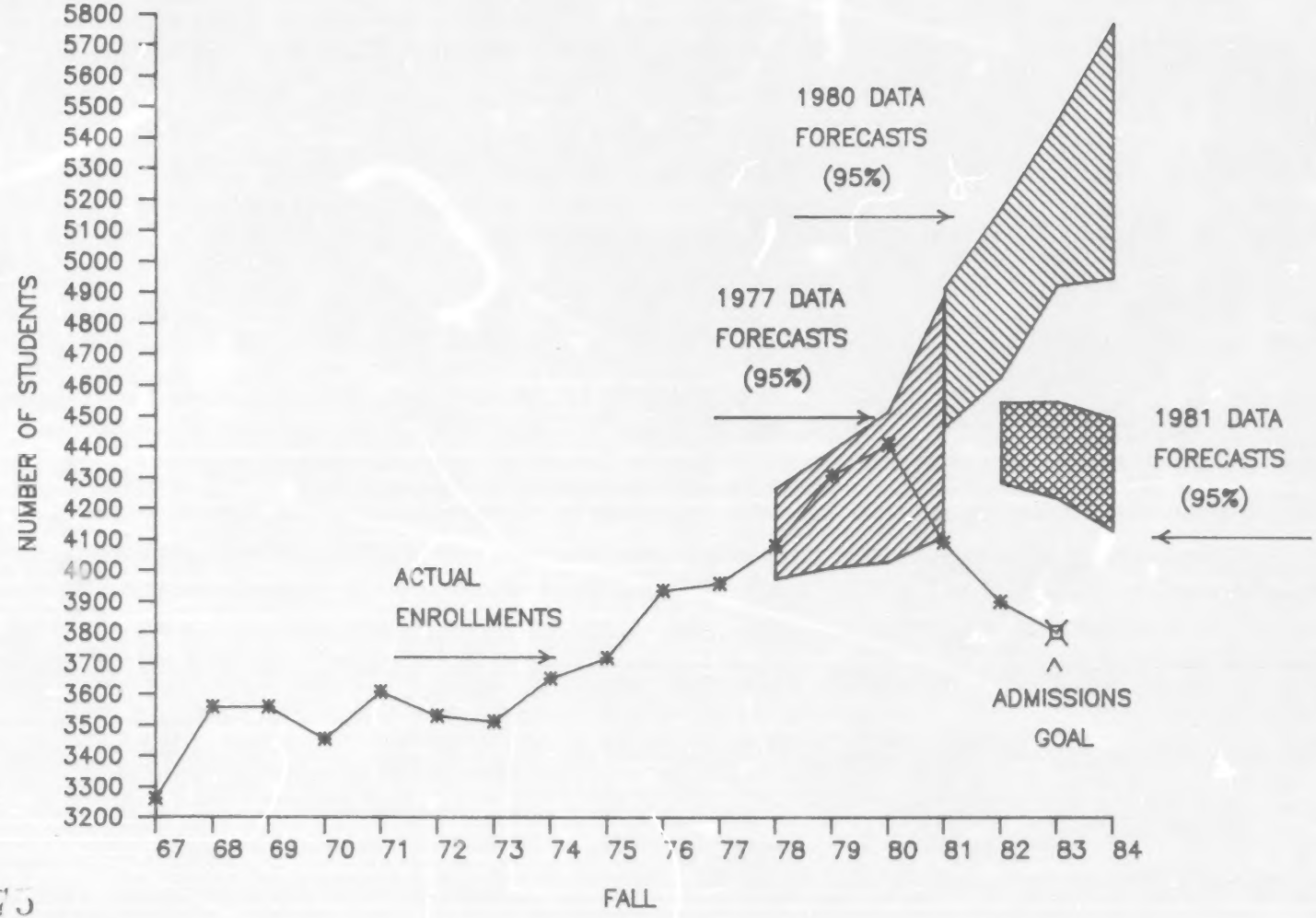
NU Freshmen Forecasts with 95% Confidence Intervals

Forecast Data Period		Years 1978	1979	1980	1981	1982	1983	1984	1985
1967-1977	UCI*	4266	4391	4517	4689				
	Y	4076	4143	4253	4443				
	LCI	3974	4010	4030	4110				
1967-1978	UCI		4370	4528	4755	5098			
	Y		4225	4334	4497	4754			
	LCI		4164	4229	4328	4497			
1967-1979	UCI			4735	5086	5502	5988		
	Y			4510	4769	5073	5424		
	LCI			4274	4177	4622	4835		
1967-1980	UCI				4918	5176	5463	5776	
	Y				4625	4833	5057	5295	
	LCI				4465	4631	4926	4950	
1967-1981	UCI					4546	4550	4495	4404
	Y					4405	4382	4300	4187
	LCI					4286	4237	4129	3996
	ACTUAL VALUES	4082	4311	4412	4093	3800			

*UCI = Upper Value of Confidence Interval
Y = Expected Value of NUF
LCI = Lower VAlue of Confidence Interval

FIGURE 1

ACTUAL ENROLLMENTS AND 95% CONFIDENCE INTERVALS



To evaluate the precision of our forecasts, we compared th· point and interval estimates with the actual entering freshmen in Table 2. Several observations are in order. First, the confidence intervals are quite large. In most of the cases the confidence interval includes the actual value. Finally, all of the forecasts, except the one made in 1981, failed to reflect the downturn in entering freshmen which occurred in 1981 (see Figure 1).

ASSESSMENT OF MODEL UTILITY FOR BUDGET PLANNING

Despite the fact that many confidence intervals do include the actual values, and that indeed some of the point estimates come remarkably close to the actual values, failure to predict any hint of reduced enrollment until after the downturn has occurred calls this naive model into considerable question as a budget planning tool. It should be noted that the model performed quite well up to the turning point. What caused this turning point: reduced high school graduates, increased competition from other institutions, or admission policy changes by Northeastern University? To some extent, all three have contributed to the downturn. Perhaps most conspicuous, was an explicit effort to cap Engineering and Business Administration entering freshmen beginning in 1981. These colleges are enjoying considerable growth in enrollments, while some of the uncapped colleges were experiencing declines.

The inescapable conclusion is that naive models using only demographic data are doomed to fail as planning tools in the environment of increasing activism by colleges and universities. Models which reflect and even predict, the impact of policy changes are becoming essential to planning.

NEED FOR ADDITIONAL PREDICTOR VARIABLES

The foregoing discussion demonstrates that the current enrollment forecasting model is not adequate for annual budget planning. However, there is a role for an enhanced version of this model in a two-phased approach to freshmen enrollment forecasting. First, for guidance over a one to two year planning horizon, the enhanced projection model will provide a forecast every Fall. Then, for more specific estimates of the next freshmen class, a model based on student perceptions provided on the admission application form will produce a revised forecast by the end of the calendar year.

To enhance the current model, we will disaggregate the forecast to the level of the ten undergraduate colleges in the University and include occupational indices relevant to each college and general economic indices. For the revised estimate, we will use a matriculation prediction model developed from survey data provided by both matriculants and non-matriculants. Analysis of this data thus far suggests that the student perceptions listed in Table 3 discriminate between matriculants and non-matriculants.

Table 3

Student Perceptions Which Discriminate Between Matriculants and Non-Matriculants

The following question items were found to be statistically significant at least at the .05 level in both mean score and score profile (based on a five point opinion scale) for matriculants and non-matriculants.

- o Member of immediate family attended or attending NU.
- o Friends currently attending NU.
- o Co-operative Education plan was an important consideration in college choice.

- o Impact of recruiting activities on college choice
  - * Visit to NU Campus
  - * Interview with Admissions Staff
  - * Meeting with NU Faculty Member
  - * College Open House
- o Impact of certain common college choice factors
  - * Tuition, Room, and Board
  - * Distance of University from Home
  - * Size of School
  - * Parent's Preference
  - * Campus Location

Use of this two-phased approached permits tentative planning early in the budget process and refinement later on, but still in sufficient time to alter many funding committments.

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COMPARATIVE FISCAL ANALYSIS IN HIGHER EDUCATION

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Introduction

Cost analysis in higher education has been documented in the literature for over fifty years. The breadth and scope of the attempts to quantify the cost of the higher education enterprise are perhaps best described in the four volume monograph, A Study of Cost Analysis in Higher Education (Adams, 1978), which was prepared under the aegis of the American Council on Education. Comparative cost analysis forms a growing sub-area within this larger field. Adams (1978, Volume 4) used a Delphi Technique with a panel of 120 faculty and administrators at all levels, to forecast the future use of comparative cost analysis in higher education. The panel predicted that the use of cost information for the purpose of cost comparison with other institutions would increase threefold from 21% of institutions in 1976 to 62% in 1995. A second prediction was an increase in investigation of the operational components which make up costs within institutions. A third prediction was that the percentage of states using cost information in deciding on the size of institutional appropriations would increase from 50% in 1976 to 81% in 1995. The studies described in this paper address all three types of comparative cost analyses predicted to increase in importance.

The growth in comparative fiscal analysis can be at least partially attributed to the early work at WICHE and NCHEMS. As Lawrence (1972) stated a decade ago:

> "A major element in the management of higher education at all levels is the use of comparable data (especially cost data). At the institutional level, interstitutional comparisons are currently an important aspect of an individual institution's evaluation process .... At the state and national levels, comparabil-

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ity of institutional data is even more critical.... As the need for, and trend toward, increased planning for higher education at the state and national level continues, the need for a common data base and standard reporting procedures becomes even more important because evaluation of state and national programs is completely dependent upon the availability of comparable data and information (p.59)."

The NCHEMS design for collecting cost comparison data, the Information Exchange Procedure (IEP), has proved problematic regarding both institutional ability to provide data in the suggested format and the benefits derived from IEP cost analysis. The problems encountered in applying the IEP approach in 6 major research universities is described in detail in Topping (1979). While the IEP approach has been found wanting, a number of institutions have developed individualized cost studies. Such studies have included internal costing analysis (e.g., cost per student credit hour by level) and external comparison or "peer" studies.

A basic concern is raised by Adams (1978, Volume I) when he notes that there is a significant lack of knowledge about decision-making in higher education. One could argue that performing comparative cost analysis is premature if the question of how such analyses will be used in the decision-making process is unanswered. The three examples presented in this paper provide limited evidence that comparative data will be used by academic decision makers if it is available, and that the use can benefit the institution.

The first study is an analysis of academic department costs for a peer group of 10 to 15 universities, including the University of Massachusetts. The second study considers costs by operational component; academics, administration, physical plant, and student affairs. The operational cost analysis study included major research institutions in 4 states. The third study compares public higher education appropriations for a peer group of 17 states.

Academic Department Costs - Peer Comparisons

Amherst campus academic deans and the provost first requested peer cost data for the academic departments in 1977. The expected use of the data in the decision making process was not stated. However, there was an implicit understanding that departments found to be comparatively high in cost would be scrutinized and possibly given lower budgets, while low cost (or under-funded) departments would have a good case for increased

budgets. A follow-up peer study was performed in 1980; additional follow-up studies are expected to be performed on a regular basis.

Peer information exchanges have become more common during the 1970's. The University of Michigan completed its first peer survey in 1974 (Adams, 1978, Volume 3). Michigan found that it took about 20 man-months to collect and develop the initial output. The data are used to provide perspective on the results of an internal cost analysis system. The University of Houston requested comparison cost data from 20 institutions in the late 1970's in support of a strategic planning model (Lawless et al, 1980). Houston's information exchange was initiated in response to the concern voiced by faculty and academic deans that departments should not be compared internally to other dissimilar departments but, instead, to similar departments at other institutions. The University of Massachusetts academic department peer study was designed to answer the same type of questions as the Michigan and Houston studies.

The mechanics of data collection included the following steps:

- identification of peer institutions
- survey design
- mailing and follow-up
- software design for data preparation and reports
- verification of data
- report generation.

Criteria used to select the 17 peer public institutions were geographic diversity, size, percent full time and percent undergraduate. The major issue in survey design was comprehensiveness versus ease of completion. The 1977 peer study opted for simplicity and obtained responses from 13 of 17 institutions surveyed. The 1980 survey attempted to obtain comprehensive data, the response rate plunged to 9 of 46 institutions surveyed. The entire process from initial request to dissemination of results on campus took an average of eight months of elapsed time and about 10 man-months of effort. The total cost was about $12,000 per study of which $7000 was for personnel, and the remainder was printing, mailing and computer costs.

Two major areas of concern became apparent as the peer studies progressed. First, the question of data comparability; for example, the definition of full-time equivalent student was different for each institution. Another example; academic department expenditures included fringe benefit costs at some institutions while such expenses were funded from university-wide or state level accounts in others. The second problem area was the question of

comparability of academic departments. One could argue that an English department emphasizing the classics might have a cost structure different than one focused on modern literature and journalism. The problem becomes much more acute when discussing specialized programs such as sports studies, exercise science or Afro-American studies. The Amherst campus solution consisted of obtaining as much information as possible on the academic emphasis of the departments in question and combining or deleting departments to obtain a subjectively determined comparability for departments defined as similar.

Use of the study results in academic planning and decision-making was neither immediate nor dramatic. The major purpose was in identifying outlying departments, those departments which had much higher or lower expenditures per student than the peer mean. There was a general raising of consciousness concerning relative expenditures at the university versus peer institutions. In particular, the Amherst campus was found to have relative high expenditures for personnel but comparatively low expenditures on support categories, such as travel, supplies and equipment, etc. As a result of this observation, the university administration began to both request additional state funding for support categories and to internally move funds into the support accounts.

The peer study was repeated in 1980; results were similar. At the present time, the university plans to cooperate with the University of Houston in a periodic collection of peer cost data. The Houston study includes 20 schools which considerably overlap with the Massachusetts peer university group. Cooperation with Houston will allow ongoing consideration of relative expenditures for academic departments at a fairly modest cost.

Operational Cost Analysis

An increasing number of university administrators and state level analysts of higher education are interested in comparative cost data for the operational components of academic institutions. The widespread use of formula funding approaches (Gross, 1973) is one example of the use of such information. An illustration of direct interest to the Amherst campus was the imposition in 1980 of a limit on the number of administrative positions funded by the state appropriation.

The interest shown by the legislature coupled with evidence of an increasing state governing board for higher education curiosity led to

a Planning Office study of formula funding and operational costs in four states - Illinois, Wisconsin, Texas and Ohio. Each state either funds the higher education enterprise via a formula based on cost analysis (the last three) or performs a detailed cost analysis as part of the budget process (Illinois).

The desired data were collected during site visits with major fiscal officers at institutions, central offices and in the legislature. All states were visited by the author with the exception of Ohio; in this case, a former Ohio state fiscal officer employed in Massachusetts provided the needed data and commentary. For the formula funding states, detailed information was obtained concerning the formula, how to apply it to an institution and any caveats which would influence use of the formula at the University of Massachusetts. Illinois provided detailed cost study data which gave comparable information. The obtained data allowed preparation of theoretical budgets, that is, budgets as if the university were located in Illinois, Ohio or Texas (the Wisconsin formula contained many idiosyncrasies which precluded such an approach).

The theoretical budgets detailed the total level of funding the university could expect if it were located in Illinois, Texas or Ohio. In addition, the budgets detailed expected funding level for the four major operational areas on campus: academics, student affairs, physical plant and administration. Unfortunately, organizational differences from state to state ruled out accurate comparisons for all four areas. However, a clear division between academic and non-academic operations was possible. The results were quite illuminating; academic affairs appeared to be funded less well than similar activities in the three comparison states while non-academic areas were funded much more generously.

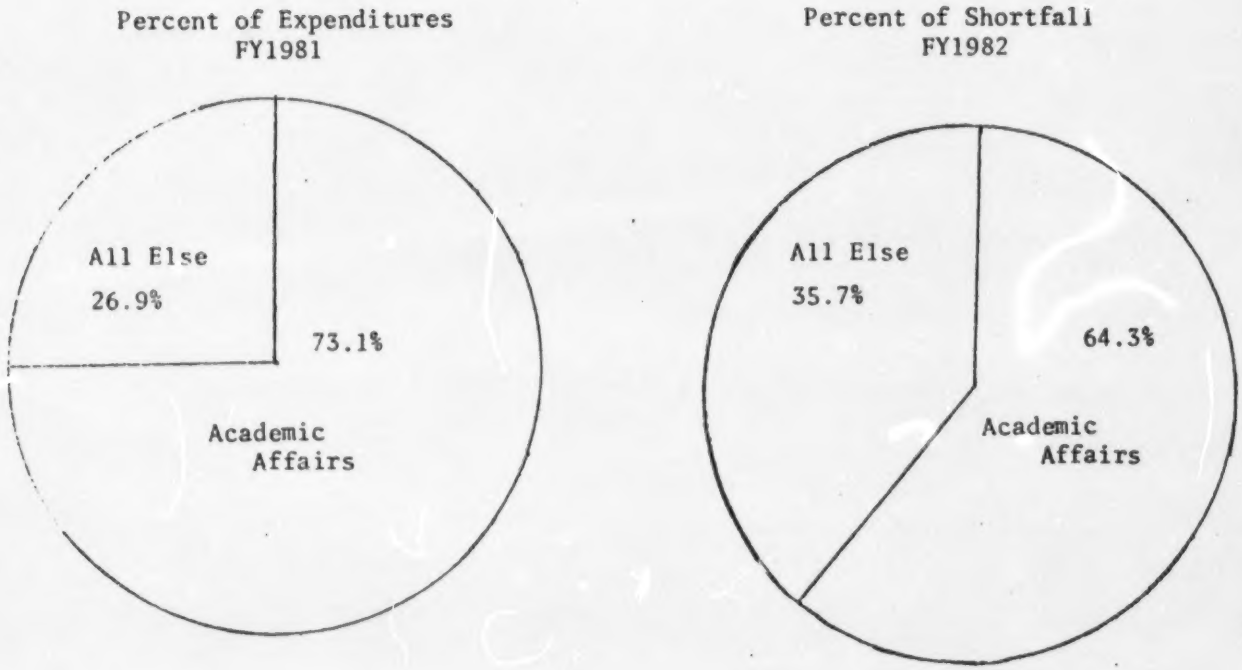
These findings were used during the next budget decision cycle to protect academic area budgets at the expense of non-academic budgets. The university was forced to absorb a $2 million budget short fall (from inflation adjusted level funding) in fiscal year 1982. Academic affairs absorbed proportionally less of the short fall while non-academic areas were given larger cuts. The percent effect is shown in Figure 1; the total dollar benefit received by the academic area in 1982 and 1983 totaled about one million dollars.

Future use of operational cost comparison data is dependent on improved

Figure 1

MOVEMENT OF $ TO ACADEMIC PROGRAMS

Allocation of FY1982 Shortfall



analysis of the non-academic areas. A detailed consideration of the Amherst campus organizational structure versus the comparison schools would allow direct comparison of physical plant costs separate from administration costs and so forth. Campus administrators have not yet agreed to fund a detailed analysis although they agree it is needed to make equitable budget decisions for the non-academic areas.

State Support for Higher Education

The Massachusetts Board of Regents, the state governing board for higher education in Massachusetts, submits the budget request for public higher education to the governor and legislature. One of their responsibilities is public and private lobbying in support of the submitted budget. The Director of Planning on the Regent's staff requested the support of the author in analyzing the comparative level of taxpayer support for public higher education in the Commonwealth. Although published analyses (Chronicle, 1978,1979,1980) ranked Massachusetts 48th or 49th of the 50 states, the accuracy of the data was suspect. The purpose of the proposed study was to obtain accurate data on relative support and to use the results in the political arena.

The first step in the study was the definition of relative support; should one look at dollars per capita or at dollars per full-time equivalent (FTE) student. Support per capita is a measure of public higher education's share of the total state budget and indicates the access provided for potential students. That is, a state with higher per capita support is funding educational opportunities for a larger percentage of its residents. The second possibility, dollars per FTE student, measures the level of support provided for students enrolled in the higher education system; i.e., the amount of money the state is contributing per enrolled student. Previous studies (Halstead, 1982; McCoy and Halstead, 1979; Chronicle, 1978, 1979,1980) largely considered the first measure, support per capita, and excluded the second. However, enrollment in private institutions of higher education comprises over 50% of Massachusetts post-secondary enrollment. Given this unique fact (the national average is much lower, near 10%) and noting that the per capita measure is probably negatively correlated with percent enrollment in the public sector, the second measure was chosen:support per FTE student.

Twenty-three comparison states were chosen for the study. The states chosen were a representative national sample according to previously published cost studies and were perceived to be high technology states and/or geographically and politically appropriate for the comparison study. Surveys were mailed in late April 1982 with telephone follow-up. A total of 18 states (including Massachusetts) responded, a 78% response rate. Special effort was made to obtain comparable data, especially on fringe benefit expenditures and use of tuition receipts. A copy of the survey and specific state data is available from the author on request.

The results, summarized on Table 1 and 2, were surprising when compared to previous results. The Commonwealth of Massachusetts funding for public higher education was close to average rather than near the bottom. For community colleges and universities, Massachusetts support per FTE was at or near the mean for the surveyed states. Only for the four year state college was support per FTE low (13th of 15). The results have been discussed with public college and university presidents and the members of the Board of Regents. To date, no decisions have been made concerning use of the data in the political arena. However, the data have been described as very revealing and useful by presidents and regents. While future use is unclear, the Director of Planning is satisfied that a major goal has been accomplished, that of obtaining accurate data and making the internal constituency (presidents and regents) aware of the situation.

Summary

Three examples of comparative cost studies have been presented and discussed. While cost effectiveness data must be considered in the context of institutional mission, the relative quality of the units compared and student demand for programs, it can identify high cost or underfunded program areas. For the three studies described above, the most important function of accurate cost comparison data was to provide a more enlightened context for the political budget decision process.

COMPARATIVE STATE FUNDING

TABLE 1: FISCAL YEAR 1982 DATA

State	2-Year Community Colleges $/FTE	Rank	4-Year Colleges $/FTE	Rank	Universities $/FTE	Rank	Subtotal 2 yr, 4 yr and University $/FTE	Rank
Massachusetts	$2,140	8	$2,223	13	$3,695	9	$2828	9
Minnesota	1,926	9	2,297	12	4,528	4	3185	6
Connecticut	1,852	11	2,356	10	4,541	3	2823	10
Texas **	2,257	6	4,697	2	3,612	11	3268	5
Maine	NA	NA	NA	NA	2,493	14	2493	15
Utah	2,716	3	2,464	9	3,453	12	3149	7
New Jersey	1,616	14	2,872	7	4,225	6	2593	14
Washington	1,887	10	2,343	11	4,899	2	2855	8
Ohio **	1,690	12	NA	NA	2,453	16	2244	16
Maryland	2,270	5	2,855	8	3,657	10	2806	11
Pennsylvania	1,439	16	4,190	3	2,458	15	2740	12
Delaware	4,306	1	6,971	1	3,221	13	3752	1
New Hampshire	1,478	15	1,653	15	2,404	17	2112	17
Rhode Island	2,239	7	3,610	5	3,918	7	3324	3
Vermont	862	17	1,931	14	1,606	18	1657	18
North Carolina	2,750	2	3,325	6	4,348	5	3275	4
Illinois	1,675	13	NA	NA	3,807	8	2658	13
California	2,396	4	4,068	4	8,213	1	3480	2
Weighted*** Average	2,140		3,454		3,866			
MASSACHUSETTS AS PERCENT OF WEIGHTED AVERAGE	100%		64%		96%			

* Does not include oil related revenues from land deeded to the University from the state; inclusion of same would add about 12% to the University's $/FTE.

** Please note that Ohio combines 4 year college data with University data throughout this report.

*** States with larger Full Time Equivalent (FTE) populations are weighted more heavily.

COMPARATIVE STATE FUNDING

TABLE 2: EXPENDITURES PER FTE: MASSACHUSETTS' RANK AND PERCENT OF MEAN

Fiscal Year	LEVEL							
	2 Year		4 Year		University		Subtotal 2 yr, 4 yr, and University	
	Rank	Percent of Weighted* Mean	Rank	Percent of Weighted* Mean	Rank	Percent of Weighted* Mean	Rank	Percent of Weighted* Mean
1978	10 of 17	79%	12 of 15	66%	8 of 18	103%	9 of 18	NA
1979	5 of 17	108	13 of 15	71	6 of 18	111	6 of 18	NA
1980	6 of 17	95	12 of 15	66	8 of 18	101	9 of 18	NA
1981	6 of 17	100	12 of 15	65	9 of 18	96	8 of 18	NA
1982	8 of 17	100	13 of 15	64	9 of 18	96	9 of 18	NA

* States with larger FTE student populations are weighted more heavily.

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BREAKING THE "VICIOUS CIRCLE" OF DECLINE AFTER A FACULTY RETRENCHMENT: A CYBERNETIC MODEL

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I. INTRODUCTION

Budget and enrollment difficulties have been well documented in the higher education literature during the 1970's and 1980's, and there seems to be no immediate relief in sight. What is of greater concern, is the more recent crisis situation developing in the public sector and in the larger independent institutions, in addition to the small, private liberal arts colleges that have been under pressure for some time. These larger colleges and universities have management and/or planning systems yet many seem unable to develop contingency plans or to cope with sudden budget and/or enrollment dislocations.

The initial responses to these environmental constraints tend to be fairly similar -- faculty and staff vacancies are not refilled; across the board budget cuts are made; maintenance is deferred; and retraining efforts are made to reallocate expertise internally -- but these are rarely successful since they deal with the symptoms rather than the root causes of the problems. In many recent situations, faculty retrenchment and program elimination have been necessary as a drastic attempt to realign the institution, its resources, its mission and its student clienteles. Unfortunately, faculty retrenchment does not guarantee an end to these budget and enrollment woes, it may only buy a little breathing room as the cycle of decline continues, perhaps leading to the eventual closure of the institution.

The contention of this paper is that the current management and planning systems are not being used to analyze many interrelationships of internal institutional and external environmental variables, and that a new approach is essential. Also, when organizations are subjected to stress, increased attention is focused upon time-honored strategies that have proven successful in the past, or simply upon managing and surviving

the current crisis. New methods of operation are generally ignored, leading to an institutional "tunnel vision" at precisely the time when consideration of the widest range of future options is required.

The sections which follow use the State University of New York, College at Brockport as a case study of an institution having budget and enrollment problems and seeking to readjust following a faculty retrenchment.

II. CYBERNETICS

Cybernetics has as its central theme, the concepts of regulation and control of systems. This discipline has tended to focus on machines, such as thermostats and automatic pilots, but it has also been successful in analyzing living organisms and social systems as more complex systems that operate under the same principles.

The following overview of cybernetics is from Ashby (1956) and points out some of the basic components of cybernetics. The basic problem of regulation is that given some essential variables of an organism or social system (E), the acceptable levels or states of these variables (n), the environment (T) and some external threats or disturbances (D); to form a mechanism of regulation (R) such that after the outcomes of the disturbances in the environment, the essential variables are kept within the acceptable levels.

One important point is that this process assumes that the essential variables have already been identified and that the acceptable states of these variables have been specified as the goal. The emphasis is to achieve the goal in spite of disturbances and difficulties.

To bring this discussion of cybernetics into an educational context, let us consider the following example. An institution requires a specified number of faculty to operate (E), but it is subject to student and budgetary aspects of the environment (T), and the disturbance (D) is a decline in the number of traditionally aged students. If the regulating mechanism (R) can anticipate this disturbance and take action, such as through tapping non-traditional student markets, the outcome to the number of faculty will remain unchanged. However, if the initial decline in students is not readily anticipated by the regulator (R), the first budgetary reductions in the environmental outcome due to the decline in students (T) will cause an initial reduction in the number of faculty in

the institution (E). This information will cause the regulator (R) to begin operating to counteract this small, initial error and prevent larger errors that could threaten the required levels of faculty at the institution.

There has been less attention paid to systems in which these processes amplify some disturbance and diverge from the original condition, rather than having them controlled or counteracted. Maruyama (1963) is the source for the review of these deviation-amplifying systems, which he defines as the "second cybernetics". Evolution of organisms and cultural change are frequent situations where this type of process operates, and work has been developed in economic systems as well. The power of this process that is so disproportional to the initial kick makes planning the direction of change vital.

Several important definitions relate to these types of systems:

1. Mutual causation exists only when the size of the influence in one direction has an effect upon the size of the influence in the other direction and is in turn affected by it.
2. These relationships can be defined by many elements, and it is the formation of loops that allows the influence of an element to come back to itself through another element. Positive relationships indicate that the changes between elements are in the same direction. Negative relationships indicate that changes occur in opposite directions.
3. A loop with an even number of negative influences is deviation-amplifying and a loop with an odd number of negative influences is deviation-counteracting.
4. Most systems contain both amplifying and counteracting loops, and the overall orientation of the system is determined by the relative strengths of each loop.
5. Under changed conditions, a deviation-amplifying loop can become deviation-counteracting, and vice versa.

III. RESEARCH DESIGN

Purposes

The primary purpose of this paper is to adapt the cybernetics model, as illustrated by Maruyama, to an institution of higher education and to examine the elements that make up the mutual causal relationships.

Specifically, this entails the identification of the major elements that impact SUNY College at Brockport from the external environment, as well as from the internal operations and the constituencies of the College. This is to be followed by a determination of the positive and negative feedback relationships that exist between these elements and the clustering of these elements of the system into deviation-amplifying and deviation-counteracting loops. The survey nature of this project marks the initial attempt to estimate the perceived relative strength of each loop and the general orientation of the system, taking the Maruyama approach from a methodological development to an operational technique. A secondary purpose is to consider the potential of how the faculty retrenchment process may have altered these feedback relationships between elements and loop and system orientations.

Methodology

The important elements were pre-determined in consultation with several other administrators. Three basic elements and their relationships were developed first -- Budget, Students and Faculty -- based on the enrollment driven nature of the SUNY system budget process and the past trends in these elements. Within these basic categories, a list of important elements was developed for the cybernetic model and then randomly assigned a place on the survey form (see Table 1). These elements were then placed in a matrix format with the main diagonal and one-half of the matrix "X"ed out. This was to eliminate the evaluation of a variable by itself and the need to evaluate converse relationships, since once A-B was indicated by a value, B-A should have the same value. Attachments to each survey form included an introduction to the survey, directions for its completion, the range of possible positive and negative values from -5 to +5, and examples of negative relationships, no relationship and positive relationships.

The exploratory nature of this survey suggested a relatively small sample, and it was determined that ten surveys each would be administered to faculty, student and administrator groups.

Survey forms were personally delivered or mailed to faculty and administrators after a personal contact designed to increase the response rate. Completed surveys were unsigned and returned in unmarked envelopes to insure confidentiality and anonymity. The student surveys were

Table 1: Budget, Student and Faculty Elements for the Cybernetic Model

Basic Category	Element Name	Survey Number
Budget	New Program Development	10
	Program Discontinuance	12
	Unemployment Rates	16
	Inflation Rates	20
	Budget Allocations	21
Students	Number of New Students	1
	Total Number of Students	3
	Competition Within SUNY	4
	Student Attrition	5
	Marketing Strategies	6
	Admissions Standards	17
	Financial Aid Eligibility	18
	External Image of Quality	22
	Number of High School and Community College Grads	23
Faculty	Program Articulation with Community Colleges	2
	Major Advisement	7
	General Education Program	8
	Faculty Research and Publications	9
	Quality of Instruction	11
	Public Service	13
	Program Review	14
	Program Quality	15
	Number of Faculty	19

administered personally at the end of a class session and collected upon their completion. The nature of the student survey insured one-hundred percent completion and return. Administrators also had a one-hundred percent response rate, perhaps because of the initial personal contact. Faculty had a rather disappointing forty percent response rate, but the impending faculty retrenchment and associated concerns may have been an over-riding factor.

Analysis

The major emphasis of the project is the examination of the three distinct groups of respondents, in terms of the elements relating to the cybernetic model. Therefore, an analysis of individual respondents to form similar groups was required. The technique chosen to group similar respondents was Q Factor Analysis, where instead of clustering variables into factors (as in R Factor Analysis) the respondents themselves were clustered into factors. Since the Q Factor Analysis procedure was not available on the existing version of SPSS (Nie et al, 1975) the data was inverted before analysis so that the rows were equivalent to the element relationships values and the columns were equivalent to the respondents. A standard factor analysis procedure was performed, including the use of communality estimates through iteration, and a VARIMAX rotation.

IV. RESULTS

A two-factor solution with a VARIMAX rotation was identified as a trade-off position between the least possible number of factors representing groups of respondents, with a reasonable pattern of loadings of each respondent with a factor in the rotated solution.

The student, faculty and administrator respondent groups disappear in the rotated factor solution. Of the 16 respondents comprising Factor 1, they include 7 out of 10 students, 7 out of 10 administrators and 2 out of 4 faculty. Factor 2 has the remaining 3 students, 3 administrators and 2 faculty.

For each factor group and for the total group of all respondents, the average rating for each of the possible element pairs was calculated. The positive and/or negative response values for all members of the factor group were totaled and then this total was divided by the number of respondents in the group to arrive at an average rating of the element pair relationships. Very few element pairs have average ratings of "no relationship" but the vast majority of them fall into the low "positive

relationship" and low "negative relationship" ranges (0.1 to 2.5 and -0.1 to -2.5). Only a few are moderate to high positive relationships (2.6 to 5.0) and there are no moderate to high negative relationships. The specific element pairs with moderate to high relationships are used for the remainder of the analysis, and it should be noted that all of these systems are deviation-amplifying since there are an even number of negative relationships, zero in all cases.

Figures 1 and 2 provide the diagrams for the total respondents view of these processes and their generalized relationships. There is a high degree of complexity in this diagram as seen by the incredible number of potential loops that can be established to indicate mutual causal relationships. These elements can be reduced by diagramming only the elements with the highest number of linkages. There are direct interrelationships between all of the possible element pairs with the exception of the number of new students and the total number of students, where there is an indirect link. What is apparent is that minor disturbances in this deviation-amplifying system can flow through a myriad of channels to move the entire system farther and farther away from its original condition without being easily monitored, regulated or controlled.

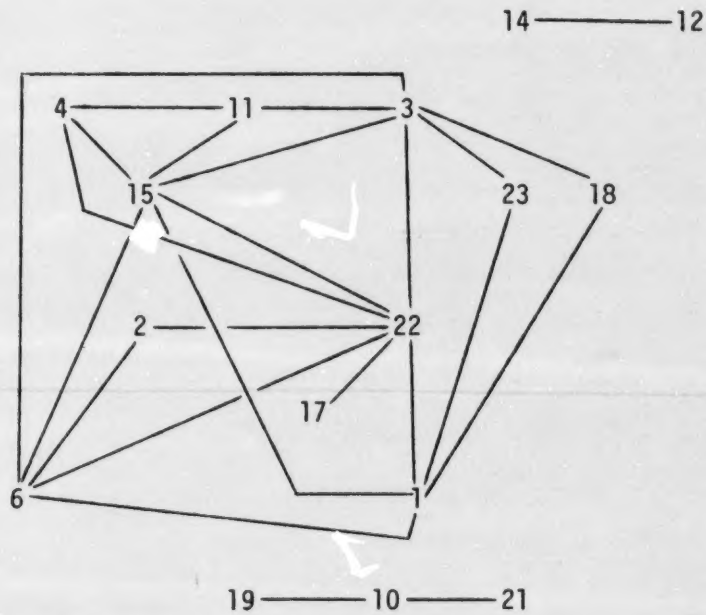
It is interesting to note how few relationships are perceived for the budgetary allocation and number of faculty elements, as well as their relatively low to moderate element relationship ratings.

The emphasis is on student numbers and quality issues, particularly the total number of students, the number of new students and the external image of quality. This may have been a function of the coincident faculty retrenchment process that had been well publicized and which had specified program quality and student demand as major evaluative factors. It is possible that the system perceptions that were obtained were somewhat affected and that the budgetary and faculty elements should have been more prominent. In any event, these elements, processes and deviation-amplifying systems are quite useful in trying to understand the complexities of the current problems and in identifying means to cope with them.

V. RECOMMENDATIONS FOR CHANGE

It would not be an overgeneralization to suggest that SUNY College at Brockport is in a deviation-amplifying system characterized by fairly abrupt changes. The condition has gone from an oversupply of students

Figure 1: Total Respondent Diagram of Element Relationships

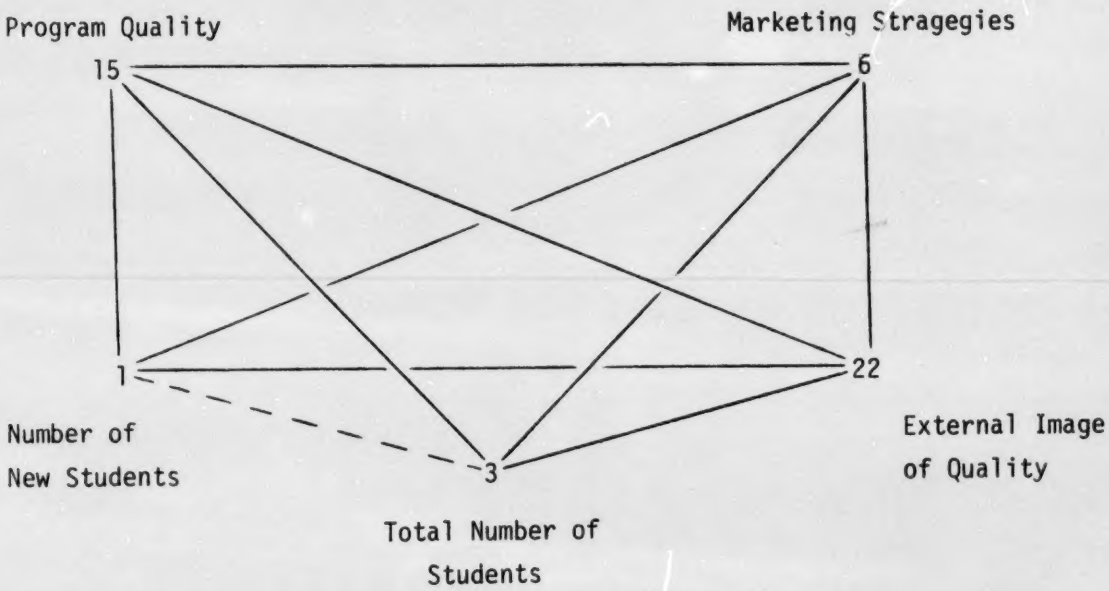


Major Elements		Linkages
22	External Image of Quality	7
15	Program Quality	6
3	Total Number of Students	6
1	Number of New Students	5
6	Marketing Strategies	5

Other Elements

2	Program Articulation with Community Colleges	17	Admissions Standards
4	Competition within SUNY	18	Financial Aid Eligibility
10	New Program Development	19	Number of Faculty
11	Quality of Instruction	21	Budget Allocations
12	Program Discontinuance	23	Number of High School & Community College Grads
14	Program Review		

Figure 2: Total Respondent Diagram of Generalized Relationships



with budget and faculty resources trying to catch up, to the current condition of an undersupply of students with budget and faculty resources being removed quickly. What makes these changes more frustrating is that there is no simple explanation of how the change started, why it continued, how it moved from a positive to a negative direction for the institution, and how or if the change can be stabilized or reversed.

The most obvious problem that currently exists is that the level of complexity and inter-relatedness of the various elements are not recognized or well understood. The same problems appear in many different contexts over time and never seem to be satisfactorily resolved. The failure of this piecemeal approach is not surprising considering the diagrams of element relationships.

Another area of concern is the identification of stabilizing factors that can be built into the system or some of its component loops, to change it from a deviation-amplifying to a deviation-counteracting system. This is particularly important because of the roller coaster nature of enrollment, faculty and budget that has been experienced at Brockport. One mechanism of stabilization is admissions standards that can be negatively related to the number of new students. Modification of this element can be deviation-counteracting, but its effects on other elements of the system, ie. program quality and external image of quality, must be closely monitored. New program development could also be negatively related to the number of new and total students, so that as the number of students decreased, the new program development would be increased. The types of additional elements that could be developed as negative relationships or positive ones that could be changed are limited only by the system effects that are to be accomplished. In the current situation, an initial kick to increase program quality, the external image of quality and/or marketing strategies would seem to be appropriate and could spread throughout the system elements to increase the total number of students and the number of new students. Once the levels of students, faculty and budget are in balance at acceptable levels, then the deviation-amplifying system can be modified to become a deviation-counteracting one.

The extablishment of specific goals and the creation of a decision making process to ensure that they are achieved are essential to the understanding and modification of cybernetic systems. As mentioned earlier, specific goals are assumed to already exist by these cybernetic

systems and the specification of acceptable levels or ranges of essential elements are required in order to determine if error conditions exist and to provide regulation to either maintain or return the essential elements to acceptable levels. The lack of specific goals and the identification of essential element levels prevents the mission of the College and its day-do-day operations from interfacing effectively. The control of day-to-day operations is not possible since there is no overall context within which they can be evaluated and compared. While they may seem to be in control at the unit level, and perhaps be seen as functioning in the best interests of the institution, at the system level they may be contributing to deviation-amplifying forces that are not apparent and that actually work counter to the best interests of the College.

The final recommendation is the development of an information mechanism that not only monitors potential disturbances in the environment, such as the decline in high school graduates and the changing participation rates, but also evaluates the outcomes of change in terms of the essential institutional variables. If these outcomes indicate a threatening situation, this information component should be able to provide recommendations for action that take into account the system interrelationships. A decision making process should also be instituted so that when the evaluation of outcomes indicates action or reaction, the appropriate response will be initiated and brought to a successful conclusion.

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INSTITUTIONAL RESEARCH IN AN EXPERIMENTAL SETTING: EXPERIENCES WITH THE NEW YORK STATE REGENTS EXTERNAL DEGREE PROGRAM

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Regents External Degree Program

Introduction

The Regents External Degree Program of the State University of the State of New York (REX) was created by the New York State Board of Regents in 1970 as an experimental program, based on the concept that what a person knows is more important than how or where the knowledge was acquired. Its central mission is "to provide an opportunity for earning a college degree to academically able individuals at low cost, regardless of age, place of residence, prior educational credentials, or constraints imposed by occupation."[1] The program implements this mission by offering academic recognition in the form of credit and degrees to students who have demonstrated college-level learning through examinations, college coursework completed through other accredited academic institutions, and/or other approved means.

The Program currently offers eight degrees: two associate degrees and two baccalaureate degrees in the arts and sciences, two associate degrees in nursing, and baccalaureate degrees in business and nursing. Over 50,000 students are or have been involved in the program since its beginning. About 16,000 are currently active candidates.

REX differs from other more traditional colleges in that

it offers no direct instruction. "The Regents External Degree drastically changes four of the procedures traditionally associated with American higher education and may will change the fifth. Formal admission requirements are abandoned, all effective methods of learning are accepted as valid, varied methods (both old and new) of measuring accomplishment are used, and the degree is awarded by what is as much a department of government as was the University of London until 1900."[2]

Students in the program are referred to as candidates, and there are no campus and no classrooms off-campus. Instead, the staff assesses and documents learning that takes place somewhere else, through several means, including the verification of transcripts and the development of tests to assess college-level learning. As candidates progress through the program they can receive written and verbal advising about methods to earn credit.

Faculty involved in the program are composed of faculty members from colleges and universities who have agreed to serve on committees to set standards and goals for the program. Faculty committees meet several teimes a year to discuss policy and to review candidates for graduation.

The day-to-day activities of the program are performed by the staff. The program is divided into units that have responsibility for specific functions, such as the Registrar and Test Development. For example, personnel in the Office of Independent Study perform the kinds of tasks most closely associated with faculty and counsellor at a more traditional

institution, such as advising and course selection. Test Development personnel work closely with faculty committees to create tests that fairly assess college-level knowledge, a task that is not usually performed at a campus on a large scale.

Research History

Research about the program and its candidates has been conducted over the last ten years to find out specific information to solve specific problems. For example, a survey of graduates was conducted in 1976 to determine where graduates were being accepted into graduate school. This information was useful in providing advice to candidates as to where to apply to graduate school, but it did not lead to planning for the entire program. Similarly, information has been collected from alumni when they donate to the alumni fund, but no comprehensive effort to reach alumni for demographic information has been planned.

A notable exception to this has been the Nursing Degree Program. The Nursing Degree Program has been systematically collecting information about its candidates and graduates since 1975. The performance of REX Associate Degrees in Nursing candidates has been monitored and compared to graduates of other New York State Nursing Programs. Graduates of both the Bachelor of Schience in Nursing and the Associate Degrees in Nursing have been sent follow-up questionnaires to elicit information about licensure, employment, professional involvement and attitudes, education, personality characteristics and nursing performance.

Two years ago it was decided that the individual research

projects outside of nursing needed to be coordinated. Provisions were made to create the position of Institutional Researcher. As originally planned, the Institutional Researcher would have responsibility for the generation of information regarding various aspects of the REX Program. The researcher would interact with various audiences to determine their information needs, develop strategies for generating the required information, carry out data capture activities, implement systems for data storage, analyze data in appropriate ways to yield the required information, and present the information effectively in written and oral form.

Research Needs of An External Degree Program

The fact that REX candidates do not reside on a centralized campus leads to some unique needs for information. Contact between faculty and candidates is minimal. Contact between staff and candidates is somewhat greater, but not every candidate receives personal contact. Thus there was a basic need to discover just who the candidates were. Much anecdotal evidence existed to indicate the kinds of people who needed the services REX provides. Systematic collection of information was now needed to give a clearer picture of candidates.

Beyond simple data gathering, there was an internal need for a centralized research office to aid in the integration of research findings into the daily decision-making process. Staff members make decisions about student advisement and the interpretation of ppogram policies on a continuous basis. Information to base these decisions on was generally anecdotal, based on the experiences of former candidates. A clear information base was

needed to provide cohesive policy advisement rather than idiosyncratic interpretations.

A third need was for the integration of research findings into the long-term planning and management of the program. In a rapidly expanding experimental program long-term planning goals often remain in the background as crtitical short-term needs are encountered. Now that the program had reached a point where natural expansion and development were beginning to slow, it was possible to reflect on what had been achieved and the best direction for the future.

Finding the Candidates

The first task was to determine just who the candidates were. This task was complicated by the enrollment and graduation process. Candidates may enroll in REX at any time of the year. Thus there are new enrollment figures on a daily basis. Candidates may graduate from REX at several times during the year. In addition, candidates may become "inactive" at several times during the year. A candidate is categorized as inactive when he or she has not paid the annual fee for two consecutive years. Inactives may be drop-outs, or they may be pausing for personal reasons, with the intention of returning. As of April, 1982, REX transferred to a monthly billing system, and candidates are now classified as inactive after two months rather than two years.

Finding the actual number of candidates in the program at any given time is complicated by all these factors. Once a time is selected, the groups that fit the criterial for being inactive, active or graduated can be identified and sampled. For research purposes that groups is then frozen during that week,

even though their actual status may change as soon as the next week.

Contacting the selected sample is the next challenge in and external degree setting. All candidates to be contacted must be reached by mail. Their addresses are available from a form they complete when they first enroll. These addresses, however, may have changed since the enrollment form was completed. Thus there are some candidates who cannot be reached until they choose to update their addresses. This is particularly true of the inactive candidates who were not identified until two years after they chose not to pay the annual fee.

The 1981 Candidate/Graduate Survey: An Example

The first large scale study of candidates' characteristics illustrates some of the problems inherent in identifying and reaching candidates. The status of candidates was frozen for May, 1981. From the information available at that time a sample of candidates were selected. These candidates were mailed a four page survey asking for basic information such as previous schooling, occupation, and satisfaction with the program.

Approximately 6,000 surveys were mailed out. The response rates varied tremendously between actives, inactives and graduates. The number of undeliverable surveys due to incorrect addresses was approximately 7% for active candidates, 12% for graduates and 34% for inactives. For example, of the surveys returned by inactives in the Business Degree Programs, 80% were undeliverable because of an unknow address.[3]

In an experimental progrom it is difficult to determine whether the surveys that are returned are representative of the

population because the population is often not well-defined. In an external degree program this becomes even more difficult because there are few other sources of background information. For the 1981 Candidate/Graduate Survey certain questions were repeated from the enrollment form so that the sample could be checked against the total population. Variables such as gender, education previous to enrollment and military status were used as internal checks because they tended not to change over time. In this case, the respondents were similar enough to the known population to warrant further consideration of the responses.

Other Sources of Information

Beyond the mailed survey, direct contact with candidates is exceedingly difficult in an external degree program. Even telephone contact becomes formidable when candidates may reside overseas, on an isolated military base, or anywhere in the United States. However, indirect information can provide some clues as to how candidates progress through the program and how they perceive the process.

A first source of information is the actual enrollment, graduation and attrition figures. Degree program within REX vary as to their requirements, and the rate of progress through the degree varies. However, if an unusually high number of candidates suddenly enter or leave the program it may be an indication that candidate perceptions of the program have changed. For example, when the Bachelor of Science in Nursing Degree became accreditated by the National League of Nursing, a group of candidates who were inactive re-enrolled in that program to finish their degrees.

Another sourse of information is available from program advisors. The advisement staff has contact with candidates through the mail and over the telephone, and they form strong and valid impressions of candidates needs and opinions. The Registrar's office also has direct contact with candidates when they verify transcripts, as do volunteer advisors in the field. Though these views of the candidates may be somewhat fragmented, when looked at as a whole they reveal a great deal about candidate characteristics.

Other secondary sources are available from examining candidate test performance, performance in other educational settings as evidenced from transcripts and military records. Each can provide information about a specific problem or can be integrated to provide a more complete picture of the program.

Use Of Available Information: Establishing Creditability

One of the pitfalls of establishing a new research office is that once the initial tasks are completed the tendency is to continue the pattern of addressing short-term needs for information while ignoring long-term planning. The need for all kinds of information is great, and the researcher may become focused on providing a great deal of information for individuals without establishing a base of information needed for the institution as a whole. In an experimental setting such as REX this temptation is even greater because there are no pre-established data collection requirements. Thus the researcher can easily become useful only in dealing with short-term crises or problems.

The next task, then, is to establish the creditability of

the office as a tool for long-term planning. In the case of REX, this was initially a process fo establishing priorities on the needs for information. The first step was to survey the staff and the faculty about their goals for the program. To accomplish this a modified version of the Institutional Goals Inventory [4] was used. Results for both professional and clerical staff were compared to responses from the faculty. This initial survey indicated that the general goals established for the program were still considered important by both faculty and staff.[5]

From these goals it was possible to begin to prioritize actual research tasks in a series of planning meetings held with unit coordinators. By specifying research tasks it is possible to provide information that can then be used to lay the groundwork for further planning and research. The research office must strongly affirm its role in producing information to meet these needs not only for more information but for better management of that information.

Conclusion

Research in an external degree setting is a challenge when the usual subjects of study are far removed from the institution Some non-traditional methods of data capture have been examined for use with external degree staff and candidates. The role of research within an experimental system has also been examined and reaffirmed. Emphasis must be placed on the need to provide coherent, cohesive information for the institution as a whole.

FOOTNOTES

1. Regents External Degree Program. Self-Study Report of the Regents External Degree Program of the University of the State of New York. Submitted for Reaccreditation to the Middle States Association of Colleges and Schools. February, 1982.

2. Houle, Cyril O. The External Degree. San Francisco: Jossey-Bass, Inc., 1973.

3. Taylor, E. The 1981 Candidate/Graduate Survey: Initial Findings. Document prepared for the Regents External Degree Program, March, 1982.

4. Educational Testing Service. Institutional Goals Inventory. Princeton, New Jersey: College and University Program, 1972.

5. Taylor, E. The REX Goals Survey: Documentation. Document prepared for the Regents External Degree Program, March, 1982.

North
East
Association for
Institutional
Research

Welcome to NEAIR's Ninth Annual Conference

Having arrived and surveyed the New England Center and environs, you can see why we have been so enthusiastic about the conference location and facilities. We are similarly enthusiastic about the impressive range of workshops, panels, seminars, and paper presentations that have been scheduled in this program. All that is left to be added is your participation: ask questions, sharpen your technical skills, compare your experiences, test your ideas. Do whatever you need to do to make this conference a success in furthering your professional development.

Best wishes for a productive conference.

Robert Ley
PROGRAM CHAIR

DOING INSTITUTIONAL RESEARCH:

A FOCUS ON PROFESSIONAL DEVELOPMENT

NINTH ANNUAL CONFERENCE
OCTOBER 17 - 19, 1982

THE NEW ENGLAND CENTER
DURHAM, NEW HAMPSHIRE

PROGRAM
SUNDAY, 17 OCTOBER 1982

11:00 A.M. - 12:30 P.M.

PRESIDENT'S PRECONFERENCE BRUNCH
(MAIN DINING ROOM)

NOON - 6:30 P.M.

REGISTRATION

1:30 - 4:30 P.M.

CONFERENCE WORKSHOPS:
(Registration required)

WORKSHOP I - CRITICAL STRATEGIES WORKSHOP FOR NEWCOMERS TO INSTITUTIONAL RESEARCH
(1:30 - 4:15 P.M., Windsor Room and
MONDAY, 8:30 - 10:00 A.M., Kearsarge Room)

Robert Grose
Amherst College

William Lauroesch
U Mass - Amherst

Convener: Nancy Neville
Rochester Institute of Technology

WORKSHOP II - METHODS OF EVALUATION RESEARCH
(1:30 - 3:30 P.M., Charles Room)

Peter Rossi
U Mass - Amherst

Convener: Robert Lay
Boston College

WORKSHOP III - COMPUTER PLANNING MODELS
(1:30 - 4:15 P.M., Berkshire Auditorium)

Daniel Updegrove
EDUCOM

J. Lloyd Suttle
Yale University

Convener: Paul Wing
NY State Department of Education

4:30 - 5:30 P.M.

TRACK I - PAPER PRESENTATIONS
(Windsor Room)

Moderator: Sarah E. Jack
Rensselaer Polytechnic Institute

GATHERING QUANTITATIVE AND QUALITATIVE STUDENT OUTCOMES INFORMATION VIA COMPLEMENTARY LONGITUDINAL STUDENT SURVEYS
(4:30 - 4:55 P.M.)

Ann Rice and Darryl Bullock
Mercy College

Sidney Micek
Syracuse University

DOING LONGITUDINAL STUDIES
(5:00 - 5:25 P.M.)

Nancy Neville
Rochester Institute of Technology

Kathy Hulbert
University of Lowell

IMPROVING THE QUALITY OF DATA OBTAINED THROUGH SURVEY RESEARCH
(5:30 - 5:55 P.M.)

Jane Grosset and Gretchen Boris
Community College of Philadelphia

TRACK II - PROFESSIONAL DEVELOPMENT SEMINAR

MARKETING STRATEGIES FOR INSTITUTIONAL RESEARCH
(4:30 - 6:00 P.M., Berkshire Auditorium)

Melissa G. Daston
Defense Intelligence College

Marilynn A. Draxl
University of Maryland

TRACK III - PROFESSIONAL DEVELOPMENT SEMINAR

MANAGING AN ONGOING COMPREHENSIVE INSTITUTIONAL RESEARCH EFFORT: CONCEPT AND APPLICATION
(4:30 - 5:30 P.M., Charles Room)
Karen M. Daguano and John P. Hendryk
SUNY - New Paltz

6:30 - 7:30 P.M.

SOCIAL HOUR
(Cash Bar, Reception Area)

7:30 - 8:45 P.M.

DINNER
(Ticket required, Main Dining Room)

9:00 - 10:00 P.M.

CONFERENCE ADDRESS
(Main Dining Room)

"STRATEGIES FOR CAMPUS COMPUTING"

John W. McCredie
EDUCOM

10:00 - 11:00 P.M.
(Reception Area)

RECEPTION - LET'S GET ACQUAINTED
Everyone is welcome. Newcomers to NEAIR are invited to meet continuing members and officers of the Association. Hosted by NEAIR Steering Committee. Cash Bar.

MONDAY, 18 OCTOBER 1982

PLEASE NOTE: Breakfast is not included in the Conference fee. You may choose to eat at the Center or in Durham proper.

8:30 - 10:00 A.M.

REGISTRATION
(Lobby)

8:30 - 10:25 A.M.

TRACK I
(Kearsarge Room)

CRITICAL STRATEGIES WORKSHOP
(WORKSHOP I CONTINUED FROM SUNDAY)
(8:30 - 9:55 A.M.)

TRACK II - PAPER PRESENTATIONS
(Windsor Room)

Moderator: Jean Stern
Siena College

DEVELOPING AN ENROLLMENT PROJECTION SYSTEM
(8:30 - 8:55 A.M.)

Randy Draper
Johnson State College

ENROLLMENT PROJECTION MODELS: SEEKING EFFECTIVE PREDICTOR VARIABLES
(9:00 - 9:25 A.M.)

Ronald F. Perry and Humberto F. Goncalves
Northeastern University

STUDENT COLLEGE CHOICE AND DECISION-MAKING
(9:30 - 9:55 A.M.)

Richard Pastor
Northern Essex Community College

MODELING COLLEGE STUDENT ADJUSTMENT AND RETENTION FOR THE INDIVIDUAL INSTITUTION
(10:00 - 10:25 A.M.)

Norman D. Aitken
U Mass - Amherst

TRACK III - PAPER PRESENTATIONS
(Charles Room)

Moderator: Judith D. Hachman
Yale University

A CASE STUDY OF THE PLANNING PROCESS
(8:30 - 8:55 A.M.)

Janyce J. Napora
U Mass - Boston

SIZE OF THE ADMINISTRATIVE BUDGET IN COMPARISON TO THE SIZE OF THE INSTITUTION
(9:00 - 9:25 A.M.)

John A. Dunn, Jr.
Tufts University

CARVING UP PARADISE: POLITICS, DATA, AND THE ALLOCATION OF SPACE
(9:30 - 9:55 A.M.)

Richard Pattensaude
SUNY - Binghamton

COMPARATIVE FISCAL ANALYSIS
(10:00 - 10:25 A.M.)

David L. Rumpf
U Mass - Amherst

TRACK IV - PAPER PRESENTATIONS
(Berkshire Auditorium)

Moderator: H. William Coles
SUNY - Buffalo

FROM HARUSPICATION TO INSTITUTIONAL RESEARCH: THE VALUE OF PROGNOSTICATION IN HARD TIMES
(8:30 - 8:55 A.M.)

Marilynn A. Drexl
University of Maryland

Hugo A. Keesing
Defense Intelligence School

ACCESS: THE SYSTEM THAT NEVER HAD A CHANCE TO FAIL
(9:00 - 9:25 A.M.)

Steven H. Gratch and Louis H. Spiro
SUNY - Brockport

BOUNDARY SPANNING: A CONCEPTUAL FRAMEWORK FOR EXAMINING THE ORGANIZATIONAL ROLE OF OFFICES OF INSTITUTIONAL RESEARCH
(9:30 - 9:55 A.M.)

Michael F. Middaugh
SUNY - Utica

THE ROLE OF INSTITUTIONAL RESEARCH - INITIATIVE OR RESPONSIVE?
(10:00 - 10:25 A.M.)

Loren Gould
Worcester State College

10:30 - 10:45 - COFFEE BREAK
(Reception Area)

10:45 - 12:00

TRACK I - PANEL DISCUSSION
(Windsor Room)

WHAT HAPPENS 'TWIXT THE CUP AND THE LIP: DATA TO INFORMATION TO ACTION

John A. Dunn
Panel Coordinator
Tufts University

David Bradley
Boston University

Edward Delaney
Keane College

William Fenstermacher
U Mass - Boston

Janyce Nepora
U Mass - Boston

Burton Sonenstein
Wesleyan University

TRACK II - PANEL DISCUSSION
(Charles Room)

A COMPREHENSIVE FACULTY EVALUATION PLAN

Sister Ann C. Luciano, Dennis J. Kolodziejski, John B. Kwasnoski, and Robert L. Campbell
Western New England College

TRACK III - SYMPOSIUM
(Berkshire Auditorium)

INSTITUTIONAL MISSION AND RELATED MEASURES

Paul Wing
NY State Education Department

Convener: Richard Heck
Colgate

NOON - 1:45 P.M.

LUNCH
(Ticket required, Main Dining Room)

1:45 - 3:10 P.M. - PAPER PRESENTATIONS

TRACK I
(Windsor Room)

Moderator: Larry Litten
Consortium on Financing Higher Education

MEASURING INSTITUTIONAL REPUTATION, ASSESSING ITS CHANGE OVER TIME, AND DETERMINING ITS IMPACT ON THE YIELD OF ACCEPTED APPLICANTS
(1:45 - 2:10 P.M.)

John P. Hendryk
SUNY - New Paltz

USING MULTI-DIMENSIONAL SCALING TO POSITION THE INSTITUTION
(2:15 - 2:40 P.M.)

David W. Bradley
Boston University

NEW SOFTWARE FOR MARKET SEGMENTATION ANALYSIS: CHAID
(2:45 - 3:10 P.M.)

Robert Ley
Boston College

TRACK II
(Charles Room)

Moderator: Jennifer Presley
Connecticut Board of Higher Education

COMPUTERIZED MODEL OF PROMOTION AND TENURE
(1:45 - 2:10 P.M.)

Winship Fuller and Susan Goodwin
University of Lowell

A MODEL FOR ESTABLISHING AND PROJECTING ATTRITION AND HIRING RATES AMONG THE NONINSTRUCTIONAL STAFF OF AN ACADEMIC INSTITUTION
(2:15 - 2:40 P.M.)

Heidi Mahoney, Stan Medinac, and Barbara Meyer
SUNY - Buffalo

THE ROLE OF INSTITUTIONAL RESEARCHERS IN LABOR CONTRACT ADMINISTRATION
(2:45 - 3:10 P.M.)

Peter Farago
Boston University

TRACK III
(Berkshire Auditorium)

Moderator: Bernadette Skobjak
Rochester Institute of Technology

SEXUAL INEQUITY IN CAREER CHOICE: HOW CAN COLLEGES HELP?
(1:45 - 2:10 P.M.)

Jean V. Morlock
SUNY - Plattsburgh

A COMPARISON OF MINORITY AND NON-MINORITY FACULTY PERCEPTIONS OF CAREER OPPORTUNITIES
(2:15 - 2:40 P.M.)

Kenneth W. Moras and G. Gregory Lozier
Penn State University

IMPROVING FACULTY USE OF STUDENT OUTCOMES INFORMATION
(2:45 - 3:10 P.M.)

Sidney S. Hicok
Syracuse University

TRACK IV
(Kearsarge Room)

Moderator: Joe Campbell
Rutgers University

PAPER PRESENTATION:
PLANNING AND COMPUTING IN THEOLOGICAL SEMINARIES
(1:45 - 2:10 P.M.)

Alexander M. Jones
EDUCOM

PROFESSIONAL DEVELOPMENT SEMINAR:
ON LINE INTERINSTITUTIONAL DATA SHARING FOR POLICY ANALYSIS
(2:15 - 3:10 P.M.)

Michael F. McNeish
EDUCOM

3:20 - 4:45 P.M.

TRACK I - PANEL DISCUSSION
(Windsor Room)

AUTOMATION AND TECHNOLOGY - PAC - MANAGEMENT?
(3:20 - 4:45 P.M.)

Ami Meganathan
Carnegie Mellon University

Daniel Updegrove
EDUCOM

TRACK II - PROFESSIONAL DEVELOPMENT SEMINAR
(Charles Room)

SPSS/SCSS: A WORKSHOP FOR BEGINNERS
(3:20 - 4:45 P.M.)

Beverly Joyce and Allie Kafel
Suffolk University

Frank Williams
The College Board

TRACK III - PROFESSIONAL DEVELOPMENT SEMINAR
(Berkshire Auditorium)

COLLEGE AND UNIVERSITY STRATEGIC PLANNING: A METHODOLOGICAL APPROACH
(3:20 - 4:45 P.M.)

James R. Hollowood
Boston College

5:00 - 5:45 P.M.

NEAIR ANNUAL BUSINESS MEETING

PRESIDING:

Helen Wyant, President
1981-82

ALL MEMBERS ARE URGED TO ATTEND

Election of officers, future conference site selections, and other Association concerns are among the items that will be covered. Participate in the future of your Association.

5:45 - ?

SOCIAL EVENING - NO SCHEDULED ACTIVITIES

Avail yourself of local restaurants and attractions. You may dine at the New England Center, but you must make your own reservations.

TUESDAY, 19 OCTOBER 1982

7:30 - 8:45 A.M.
Breakfast meeting of old and new steering committee members (Dining Room).

9:00 - 10:20 A.M.

TRACK I - PAPER PRESENTATIONS
(Windsor Room)

Moderator: Richard Pastor
Essex Community College

MEASURING THE IMPACT OF PROPOSED FINANCIAL AID CUTS: THE PERFECT STUDY IS ALWAYS TOO LATE
(9:00 - 9:25 A.M.)

Gail Hogan, Larry W. Metzger, Judith K. McPartland
Ithaca College

THE ECONOMIC CONTRIBUTION OF THE CONSORTIUM OF UNIVERSITIES TO THE WASHINGTON METROPOLITAN AREA
(9:30 - 9:55 A.M.)

Edward D. Jordan
Catholic University

ESTIMATING NET COST OF COLLEGE ATTENDANCE IN NEW YORK STATE
(10:00 - 10:25 A.M.)

Donald Nutter, Susan Silverman, and Paul Wing
New York State Education Department

TRACK II - PAPER PRESENTATIONS
(Charles Room)

Moderator: Kathleen Kopf
SUNY - Albany

PUBLICATION USAGE INDEX (PUI): A QUANTITATIVE METHOD OF EVALUATING THE PUBLICATIONS OF SCIENCE FACULTY
(9:00 - 9:25 A.M.)

Gloria J. Dyer
Fairleigh Dickinson University

STRATEGIC PLANNING AND RETRENCHMENT: WORKING WITH DEPARTMENT CHAIRS
(9:30 - 9:55 A.M.)

Antoinette Iadarola
Saint Joseph College

BREAKING THE "VICIOUS CIRCLE" OF DECLINE AFTER A FACULTY RETRENCHMENT: A CYBERNETIC MODEL
(10:00 - 10:25 A.M.)

Louis H. Spiro
SUNY - Brockport

TRACK III - PAPER PRESENTATIONS
(Berkshire Auditorium)

Moderator: David Rumpf
Northeastern University

DEGREE PATTERNS AND ENROLLMENT TRENDS
(9:00 - 9:25 A.M.)

Donald G. Hester
Albany, New York

LEADERSHIP IN PRIVATE LIBERAL ARTS COLLEGES
(9:30 - 9:55 A.M.)

Gloria J. Dyer
Fairleigh Dickinson University

STUDENT CHOICES: WHY ARE ELECTIVE COURSES ELECTED?
(10:00 - 10:25 A.M.)

Robert F. Grose
Amherst College

TRACK IV - PROFESSIONAL DEVELOPMENT SEMINAR

MICROCOMPUTERS IN INSTITUTIONAL RESEARCH
(9:00 - 10:20 A.M., Kearsarge Room)

Ronald L. Orcutt
EDUCOM

10:30 - NOON

TRACK I - PAPER PRESENTATIONS
(Windsor Room)

Moderator: Ed Delaney
Keene College

AN ACADEMIC MANAGEMENT DATA BASE: INSTRUCTIONAL UNIT PROFILES AT SUNY-BUFFALO
(10:30 - 10:55 A.M.)

Lawrence Kojaku
SUNY - Buffalo

INSTITUTIONAL RESEARCH IN AN EXPERIMENTAL SETTING: EXPERIENCES WITH THE NEW YORK STATE REGENTS EXTERNAL DEGREE PROGRAM
(11:00 - 11:25 A.M.)

Elizabeth Taylor
NY Regents External Degree Program

THE DESIGN AND IMPLEMENTATION OF AN EVENING STUDENT SURVEY: METHODOLOGICAL ISSUES AND PRACTICAL CONSIDERATIONS
(11:30 - 11:55 A.M.)

Linda Lyons
Jersey City State College

TRACK II - PANEL DISCUSSION
(Charles Room)

THE TRAINING AND USE OF PEER CONSULTANTS IN DEPARTMENTAL SELF-EVALUATIONS
(10:30 - Noon)

Marjorie K. Raab, Tom Fernandez, Anne Christian, John Q. Adams, Elliot Kitay, and Terry F. O'Dwyer
Nassau Community College

TRACK III - PANEL DISCUSSION
(Berkshire Auditorium)

PROFESSIONAL PERSPECTIVE ON INSTITUTIONAL RESEARCH
(10:30 - Noon)

Hugh M. Dempsey
Panel Coordinator
Saint Vincent College

TRACK IV - PROFESSIONAL DEVELOPMENT SEMINAR
(Kearsarge Room)

DEVELOPING DATA INTEGRITY AND USER CONFIDENCE IN CENTRALIZED MANAGEMENT INFORMATION SYSTEMS

John P. Mandryk
SUNY - New Paltz

Michael Middaugh
SUNY - Utica

* PLEASE REMEMBER TO COMPLETE AN EVALUATION FORM BEFORE LEAVING THE CONFERENCE

NOTES NOTES NOTES NOTES NOTES NOTES NOTES

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The logo and symbol of NEAIR were conceived and executed by Sharon Heyenck, M.S. in Communication Design, Rochester Institute of Technology. It symbolizes the affiliation of NEAIR with the International Association for Institutional Research, the networking and cooperation which the Association supports, and the flow of information in and out of an IR office. The northeast quadrant is highlighted to emphasize the close relationships among IR professionals in that area, and their formal association.